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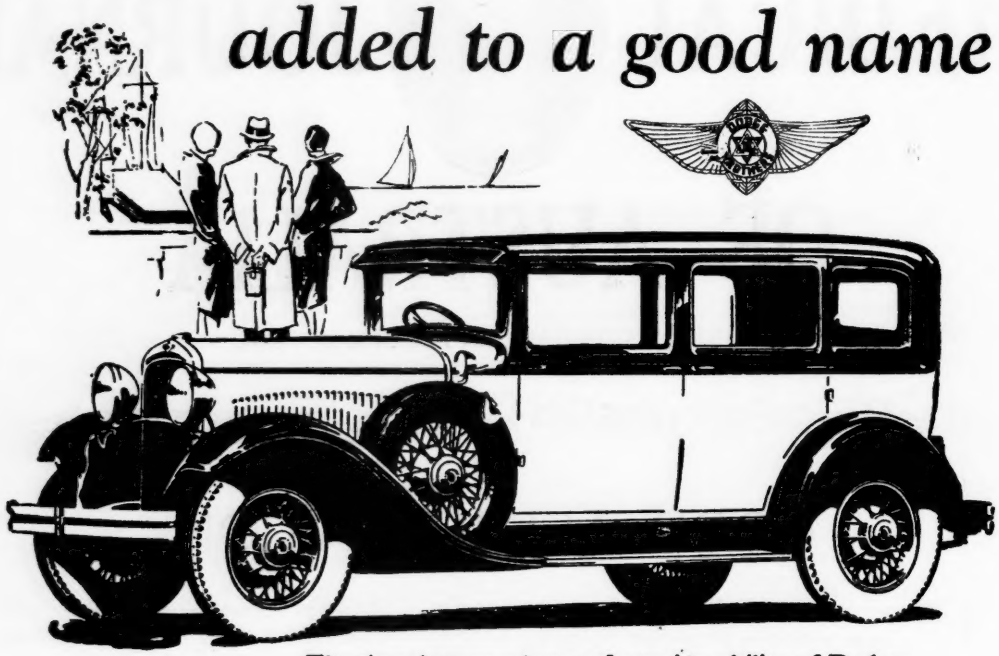

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THE REFRACTIVE INDEX OF THE CEREBRO-SPINAL FLUID.

By W. J. PENFOLD, M.B., Ch.M. (Edinburgh), D.P.H., B.Hyg. (Durham), M.R.C.S. (England), L.R.C.P. (London),

AND

C. A. E. PRICE.

From the Baker Medical Research Institute, Melbourne.

THE routine physical examination of the cerebro-spinal fluid, as presently conducted, seems to be singularly incomplete. For example, the monograph on the cerebro-spinal fluid by Greenfield and Carmichael (1925)[1] makes mention of the specific gravity of the normal cerebro-spinal fluid, but never suggests that deviations from the normal may be of value in the diagnosis of disease. This is probably due to the difficulty in making the observations with such a degree of accuracy as really to help the physician. The small amount of fluid sometimes available and the small deviations of the specific gravity from the normal in the great majority of fluids from cases of disease would make precise weighing of a definite volume of the fluid measured at a definite temperature a necessity. This would be troublesome. The current methods used in the taking of the specific gravity of urine or blood would not be adequate, even if sufficient fluid were available. The result is that the degree of clarity or cloud, the absence or presence of fibrin or pus and the colour of the fluid usually comprise its total physical examination in the laboratory, while the determination of the pressure under which it is held, is usually made by the clinician.

A few observations on the freezing point, conductivity, viscosity, surface tension and optical rotation have been made, but none of these determinations has merited the favour of the laboratory physician as being suitable for routine use.

A few workers have explored the possibilities of the refractive index. A survey of the small available literature on the subject and especially our own experience make us believe that a good deal of useful information is to be obtained from it. Polanyi[2] (1911) obtained *post mortem* the cerebro-spinal fluids of four cases of hydrocephalus and found them to have refractive indices which varied from 1·3499 (23° C.) to 1·33516 (21° C.). His results have small clinical interest, as *post mortem* fluids cannot be compared with fluids obtained during life. Moreover, the chemical analysis of the fluid given by Polanyi seems to throw doubt on the correctness of his figures.

Babes and Babes[3] usually found the refractive index to rise above normal in epidemic cerebro-spinal meningitis and they concluded that rise of the index was due rather to organic substances (particularly albumin) than to inorganic.

Palmegiani[4] (1914) wrote on the subject of the refractive index of the fluid, but his paper does not appear to be available locally.

Molnar[5] (1923) determined the normal refractive index of the cerebro-spinal fluid by the use of fluids from patients about to undergo spinal anæsthesia for operation for hernia and also from indiscriminate fluids which gave no reaction to Wassermann, Pandy and Nonne-Apelt tests. This latter method of selection of the normals does not take cognizance of the difficulty that excess of urea, glucose and to some extent chloride may raise the index. Molnar's average figure for the normal was 1·33501. He admitted variations from 1·33486 to 1·33517 as within normal limits. His value for the normal approximates very closely to what we have found.

In 1926 Jones[6] compared the index of the cerebro-spinal fluids he examined with the clinical laboratory findings, claiming to be the first to do this. His findings, however, did not include any chloride, urea or total coagulable protein estimations, so that his results are very incomplete. He gives the indices of six normal fluids which he found to be 1·3346 or 1·3347 with an average value of 1·33463. Nevertheless, the text of the paper shows that he considers 1·3341 as within normal limits. He does not define the upper and lower limits of the normal. Jones worked at a temperature of 20° C., which we have found from experience would make his readings about twenty units in the fifth place of decimals lower than ours taken at 17·5°. If this be added to his normal average of 1·33463 we obtain a reading of 1·33483 which is still a little lower than what we believe to be normal.

Levinson and Serby[7] (1926) wrote on the subject of the refractive index of the cerebro-spinal fluid. They discussed the difficulty and practical impossibility of obtaining normal fluid. They therefore accepted as normal for the purposes of their work the fluid of sixty-six persons who had no meningitis and no syphilis. This policy ignores the fact that several other diseases can cause a rise of the index, as we shall subsequently show and may account for the relatively wide range of refractive index that Levinson and Serby considered to be normal, namely, 1·33472 to 1·33545. This difference corresponds to 73 units in the fifth place of decimals as against Molnar's normal range of 31 units in the same place of decimals. Levinson and Serby excluded from their supposedly normal fluids two which, though they were neither syphilitic nor meningitic, showed such deviations from the usual index as to be obviously abnormal. They concluded that the normal average refractive index of the cerebro-spinal fluid was 1·33508 which is practically identical with our own result (1·33510). We cannot accept, however, the wide range of the normal that they suggested.

In order to test the value of the refractive index for clinical and research purposes a series of normal and diseased fluids has been examined. The normals have been obtained from persons about to undergo spinal anæsthesia and from persons incorrectly suspected of having meningitis or other disease of the central

nervous system. The instrument used for making the observations has been the dipping refractometer of Zeiss which is provided with an accessory prism so that very small amounts of fluid can be used. All our work has been done by means of the accessory prism. The observations were all made at 17·5° C. to bring them into line with the refractive index observations of Wagner,[8] Reiss[9] and others who have used this instrument in other fields of work. The temperature was secured by having the lower end of the instrument submerged in a water bath. The reading is usually at first lower than it should be, but after waiting from two to five minutes it has come to the highest point it will reach and this is taken as the index. The low initial reading is due to the warming of the prism occasioned by cleaning it. Immediate readings are misleading and should be carefully avoided, unless special precautions are taken.

Daylight was used in making the readings, the colour fringes being removed by suitably adjusting the Amici compensator supplied with the instrument. The use of monochromatic sodium light has been shown to be unnecessary for the great bulk of practical work. The margin of the shadow area must be sharp. If it be not sharp or if it be duplicated, variations of temperature between different parts of the submerged system exist or some defect in the setting up of the sample or adjustment of the instrument has occurred. Such readings should be discarded. We have not found any cerebro-spinal fluid in which we have been unable to get a very sharp boundary line. Wagner[8] claims that estimations can be taken accurately to within two units in the fifth place of decimals, but this involves the average of a series of readings and is not necessary in much of our clinical work. If the refractive index of each of several samples of the same fluid is once carefully determined, the results should all fall within four units in the fifth place of decimals of the average of the total number of readings. We have usually contented ourselves with taking the average of two readings.

The Refractive Index of the Normal Cerebro-Spinal Fluid of Man.

At first it appeared that the best material to use to ascertain the refractive index of the normal cerebro-spinal fluid would be the samples removed antecedent to the induction of spinal anæsthesia.

The first eight of these examined are briefly dealt with in Table I.

One of the specimens (58) showed a very definite excess of protein and was, therefore, excluded from the series. The other seven showed an average refractive value of 510 units in the fifth place of decimals. The average deviation from this figure was only two units and the extreme deviation six units in the fifth place of decimals. This is extremely constant compared with the refractive index of the other body fluids, for example, human serum from a series of 97 persons tested varied in its refractive index from 1·34575 to 1·35425.

TABLE I.

The Refractive Index of the Cerebro-spinal Fluid of Patients about to undergo the Induction of Spinal Anæsthesia.

Serial No.	Refractive Index.	Coagulable Protein, Milligrammes per 100 Cubic Centimetres.	Chlorine as Sodium Chloride, Milligrammes per 100 Cubic Centimetres.	Disease or Nature of the Operation.
1	1·33504	—	—	Cancer of *cervix uteri*.
5	1·33508	20	700	—
6	1·33512	40	730	Cancer of the body of the uterus.
11	1·33512	—	—	Plastic vesical operation.
55	1·33508	—	—	—
58	1·33520	80	740	Double inguinal hernia.
60	1·33512	40	—	Enlarged prostate.
73	1·33511	50	750	Carcinoma of the uterus.

From these figures it may be concluded provisionally that the refractive index of the normal cerebro-spinal fluid at 17·5° C. is approximately 1·33510 and this may be used as a standard figure from which to measure the deviations of disease. The endeavour to establish the normal refractive index of the cerebro-spinal fluid of man will be continued as material becomes available.

The view that these fluids from patients with spinal anæsthesia would give the best information about the normal index requires further examination. Spinal anæsthesia is largely used in operations on the lower part of the abdomen in persons of middle or old age in whom kidney damage or a somewhat raised blood sugar is not by any means infrequent. As will hereafter be shown, these disturbances are commonly associated with alterations of the refractive index of the cerebro-spinal fluid.

In these cerebro-spinal anæsthesia cases also only small quantities of the fluids are made available for the laboratory—approximately five cubic centimetres in each instance—so that a complete chemical examination is impossible with our present methods. An index widely divergent from the normal may not in these circumstances be capable of satisfactory chemical investigation.

The Cerebro-Spinal Fluid in the Young.

In arranging with Dr. R. Webster for a series of specimens of cerebro-spinal fluid from children, we were moved by the fact that McLean and McIntosh[11] state ("The Human Cerebro-spinal Fluid," 1926) that the specific gravity of the cerebro-spinal fluid in children is 1002, while Greenfield and Carmichael,[1] quoting Levinson and Mestrezat, state that the specific gravity of the normal human cerebro-spinal fluid varies from 1006·4 to 1008. Kafka[12] holds ("The Human Cerebro-spinal Fluid," 1926) that the cerebro-spinal fluid varies in specific gravity from 1002 to 1008.

If the values of McLean and McIntosh are correct, one would expect to find a very low refractive index in the case of children, but this has not been found to be the case in the material we have examined, as the results given in Table II show.

TABLE II.

Children's Hospital Cases.

Diagnosis.	Refractive Index.	Coagulable Protein, Milligrammes per 100 Cubic Centimetres.	Salt, Milligrammes per 100 Cubic Centimetres.	Cells.	Wassermann Reaction.
(1) Acute anterior poliomyelitis	1·33513	80	730	4 lymphocytes. 6 polymorphonuclear cells.	
(2) Cerebellar tumour?	1·33540	240	740		
(3) Acute tonsillitis with meningeal symptoms	1·33504	10	730		
(4) Tuberculous spine	1·33503	10	750	1 lymphocyte.	
(5) Epileptiform fits	1·33504	20	730	215	+
(6) *Encephalitis lethargica*	1·33512	30	700		
(7) Acute anterior poliomyelitis	1·33511	30	710		
(8) Deaf mutism (two years' standing), not congenital ..	1·33508	20	720		
(9) Acidosis, petechial hæmorrhages, rash, delirium; endocarditis?	1·33512	10	750		

Of the above nine specimens two show definite increase in the protein. The other seven have a refractive index which averages approximately 508 units in the fifth decimal place. The average deviation from this reading is only three units and the maximum deviation is five units in the fifth decimal place. The reading corresponds almost exactly with that obtained in the spinal anæsthetic cases in the human adult. Although the children were not normal, apparently the seven specimens of spinal fluid which were normal in respect of protein content, were likewise normal in their refractive indices.

The Deviations of the Refractive Index of the Cerebro-Spinal Fluid in Disease.

Considerable deviations have been found by us in patients with renal disease, complicated by diabetes in some cases and by tuberculous meningitis in one case. The renal disease usually took the form of chronic nephritis or tuberculous disease of the kidney, but in one case (No. 50) it was acute nephritis.

In Table III the refractive index of each fluid is set down with the results of the chemical analysis of the fluid.

A short abstract of the clinical notes of the above cases is given herewith.

FLUID NUMBER 49.—The patient, a female, aged sixty-six years, was admitted on May 24, 1927, with a fractured tibia and fibula. There was a previous history of slight *pruritus vulvæ*.

Two days after admission the fasting blood sugar content was found to be 0·256% and the urine contained sugar, diacetic acid and acetone. On June 3, 1927, the fasting blood sugar was 0·358%. Forty units of "Insulin" were given during the day. On the following day the patient was still glycosuric and inclined to be drowsy. Fifty units of "Insulin" were administered. A blood urea estimation showed 70 milligrammes per 100 cubic centimetres.

Next day the urine was free from diacetic acid and acetone, but contained 0·2% sugar. On the following day it was free from sugar also.

On June 8, 1927, the condition of the patient was apparently improved, but a blood urea estimation showed 127 milligrammes per 100 cubic centimetres. Two days later the condition was grave. A lumbar puncture was done. The result of the refractive index examination of the spinal fluid is given in Table III. The blood urea had risen to 185 milligrammes per 100 cubic centimetres. On the following day another blood urea estimation gave 239 milligrammes per 100 cubic centimetres. On this day, June 11, 1927, the patient died.

During the two and a half weeks the patient was in hospital the temperature did not rise above 38·1° C. (100·6° F.).

The diagnosis was chronic nephritis with uræmia and diabetes.

FLUID NUMBER 48.—The patient was a female, aged fifty-nine years, who was admitted on July 21, 1927. She had had asthma six to eight months previously, but no other serious illness and she gave no history of kidney disease. Three days before admission she become very constipated and very thirsty. The day before admission she was restless and complained of giddiness. Later in the day she vomited and was noticed to be breathing deeply. During the night she had what was possibly a fit and in the morning became comatose.

On admission the patient was found to be drowsy, but she could be roused and would then answer questions fairly

TABLE III.

The Refractive Index of the Cerebro-spinal Fluid in Cases of Disease of the Kidney with Diabetic and Other Complications.

Serial No.	Refractive Index.	Coagulable Protein, Milligrammes per 100 Cubic Centimetres.	Sodium Chloride, Milligrammes per 100 Cubic Centimetres.	Urea, Milligrammes per 100 Cubic Centimetres.	Glucose, Milligrammes per 100 Cubic Centimetres.	Cells per Cubic Millimetre.	Nature of Disease.	Result.
49	1·33708	60	—	—	—	—	Uræmia, chronic nephritis, diabetes.	Died.
48	1·33616	>100	—	200	386	<3	Coma, chronic nephritis, diabetes.	Died.
47	1·33604	20	760	—	—	1	Uræmia, chronic nephritis.	Died.
46	1·33590	30	730	570	—	20, chiefly lymphocytes.	Uræmia, tuberculous kidneys.	Died.
45	1·33590	>100	600	—	—	150 lymphocytes with some polymorphonuclear cells.	Tuberculous kidney and tuberculous meningitis.	Died.
51	1·33558	70	780	66	—	58, lymphocytes chiefly.	Uræmia, tubulo-nephritis and arterio-sclerosis.	Died.
50	1·33537	20	770	66	117	Many red cells.	Acute nephritis.	Recovery.

well. The respirations were deep and laboured and the breath rather sweet. The pulse was very weak and the systolic blood pressure 128 millimetres of mercury, the diastolic pressure was 110 millimetres of mercury. The pupils did not react to light or accommodation. The fundi were dimly seen, but were apparently normal. Twenty units of "Insulin" were given. The blood sugar was 0·39%. The urine contained diacetic acid and acetone and 0·4% sugar. The carbon dioxide combining power of the plasma was 16% at 10.30 a.m. At 11.30 a.m. forty units of "Insulin" were given. At noon the patient was still deeply comatose and the breathing was still laboured. She was taking fluid freely. Forty units of "Insulin" were given. An hour later she was slightly less drowsy, but reflexes could not be elicited. The blood sugar was 0·380% and forty more units of "Insulin" were given. At 5 p.m. the blood sugar was 0·398% and the carbon dioxide combining power of the plasma was 22%. At 6 p.m. the general condition was slightly improved. The urine contained 0·4% of sugar and some acetone. One hundred units of "Insulin" were given. During the day lumbar puncture was performed and examination of the fluid gave the results shown in Table III. At midnight the blood sugar was 0·392%. The next day the patient died.

The diagnosis was *diabetes mellitus*, chronic nephritis, uræmia and coma.

FLUID NUMBER 47.—The patient, a male, aged sixty-five years, was admitted on October 23, 1928. For two months he had been unable to sleep and suffered from anorexia. For the past three weeks he was unable to eat because of vomiting and dry retching. He had recently lost weight. On the day of admission the patient was drowsy, but not comatose. The tongue was dry and furred. On the following day a blood urea estimation showed 275 milligrammes per 100 cubic centimetres. Two days later the cerebro-spinal fluid was examined, giving the result shown in Table III. On October 28, 1928, the patient was still vomiting, very restless and drowsy. The temperature was slightly subnormal during the week in hospital. On October 29, 1928, the patient died.

FLUID NUMBER 46.—The patient, a male, aged twenty-five years, was admitted on November 2, 1928. The right knee had been excised eight years previously and the patient had recovered and had felt very well. During the last nine months before admission, however, he had complained of weakness, lassitude and inability to work, with odd attacks of vomiting and a dull pain in the left side of the chest. A painless swelling had developed over his left ribs, but this, he thought, had been getting better.

On admission examination of the abdomen revealed a large non-inflamed fluctuant swelling fairly tense over the lower ribs extending on to the left hypochondrium; it was not tender. There was a protuberance of the dorsal spine which was not tender. Spinal movement was painless. The swelling was aspirated and fifty cubic centimetres of caseous blood-stained fluid were removed.

On November 5, 1928, an X ray examination showed that the bodies of the ninth and tenth dorsal vertebræ had fallen together to form a wedge shaped mass. On November 8, 1928, the abscess was again aspirated. Examination of the pus revealed the presence of tubercle bacilli. Two days later the patient vomited and complained of headache which, he said, he had had for nine weeks. On November 14, 1928, the mental condition was confused. The systolic and diastolic blood pressures were 120 and 74 millimetres of mercury respectively. The amount of urine passed was diminished. Lumbar puncture was performed and the spinal fluid obtained was under increased pressure. The result of the examination of the fluid is shown in Table III.

On the following day examination showed the pupils which had previously been normal, to be unequal, with the right larger than the left. They did not react to light and there was no strabismus. No reflexes could be elicited. There was great generalized motor weakness, but no actual paralysis. A slight discharge was present from the left ear. Later in the day the patient died. During the time in hospital the temperature varied between 36·1° and 37·2° C. (97° and 99° F.).

The *post mortem* notes showed that the vessels of the brain were congested. The *dura mater*, *pia mater* and arachnoid showed nothing abnormal. No evidence of tuberculous meningitis was found.

In the lungs pleural adhesions were present at both apices, with much scarring and fibrosis, particularly at left apex.

In the abdomen the left kidney (weight 240 grammes or eight ounces) was enlarged with slightly adherent capsule. On section there were numerous cavities containing cheesy-like material with firm fibrosed walls involving both cortex and medulla. The small amount of kidney tissue present contained tubercles and much generalized fibrosis. The ureter was thickened. The right kidney showed similar changes. Cystitis was present.

In the skeleton tuberculosis of the spine was found. The causes of death were tuberculosis of the kidneys and uræmia.

FLUID NUMBER 45.—The patient, a male, aged forty-seven years, was admitted on October 3, 1928. He gave the following history. Four months before admission the scrotum became swollen. Ever since there had been bilateral swelling with some degree of pain. Two or three weeks after the swellings appeared, pus began to discharge anteriorly by two openings in the scrotum. The pus was yellow and rather thin. At the time of admission he still had bilateral anterior scrotal sinuses. Until shortly before admission his general health had been good, but five days before malaise and feverishness commenced.

On October 6, 1928, pus from a sinus was examined. Gram-positive diplococci were present; no tubercle bacilli were seen. On the night of October 8, 1928, 210 cubic centimetres (seven ounces) of overflow urine were passed, the bladder having been distended during the previous twenty-four hours. There was incontinence of fæces. The patient's bladder was catheterized and a slight stricture was found in the bulbous urethra. The urine contained scattered pus cells. No tubercle bacilli were seen.

The left eye showed definite ptosis with considerable dilatation of the pupil and very sluggish reaction to light. Kernig's sign and a slight amount of neck rigidity were present.

The patient was submitted to lumbar puncture on three occasions, namely, October 8, 10 and 11. The result of the examination of the fluid taken on October 11, 1928, is described in Table III. Similar results were obtained with the other two samples taken. The results of the tryptophane and Wassermann tests with the spinal fluid were both positive.

On October 12, 1928, the patient died. During the whole nine days he was in hospital his temperature was moderately raised.

The *post mortem* notes showed that in the brain there was congestion of the cortical vessels. The leptomeninges at the base of the brain were opaque with greenish exudate round the optic nerves. Tubercles were present around the basilar artery, the circle of Willis and along the Sylvian fissure. Turbid cerebro-spinal fluid under increased pressure was present in both lateral ventricles.

In the thorax pleural adhesions were present at both apices.

The right kidney weighed 225 grammes (seven and a half ounces). In the pelvis a few petechial hæmorrhages and congestion were present. The cortex showed normal demarcation. The capsule stripped readily. The arteries were not arteriosclerotic.

In the left kidney the perirenal fat was adherent to the kidney. It weighed thirty grammes (one ounce). Section revealed very little kidney substance present. There were several thick walled cortical cavities found filled with creamy material. The lumen of the left ureter was obliterated and was replaced by thick walled caseous cavities, surrounded by fibrous tissue. The right ureter was similarly affected, but to a less extent.

In the prostate there were large caseous areas and much intervening fibrosis.

Both epididymes were caseous. The testes were apparently normal.

In the right lung thickened areas were found in the pleura at the apex. There was a contracted upper lobe. Many small cavities were present at the apex. There was generalized fibrosis with small foci of caseation. The lower lobe was very œdematous and congested.

The upper lobe of the left lung showed widespread tuberculosis. The lower lobe was congested.

The cause of death was generalized tuberculosis affecting the meninges.

FLUID NUMBER 51.—The patient, a male, aged fifty-nine years, was admitted on January 10, 1929. The illness started three days previously with a "fit" which was repeated twice on the first day. Two fits occurred the next day and one on the third day. The patient had not spoken since the onset of his illness and though unable to eat, could drink some fluid. On admission he was semi-comatose, with pin-point pupils. The tongue was dry and furred. The pulse was fairly rapid and the arteries thickened. The patient showed paresis of the left seventh nerve.

On the day following admission the cerebro-spinal fluid was examined with the result shown in Table III. The same day the blood urea was estimated and found to be 68 milligrammes per 100 cubic centimetres. The patient was in hospital for five days, during the first two of which the temperature was swinging slightly; it then rose to 39·4° C. (103° F.) shortly before death on January 15.

Post mortem examination revealed toxic nephritis. The epithelium of the secreting tubules was largely necrosed.

FLUID NUMBER 50.—The patient, a boy, aged sixteen years, was admitted on January 29, 1929. The illness had commenced fourteen days previously with a cold and sore throat. He had been drowsy and difficult to awaken in the morning. Four days before admission he was noticed to be puffy about the face. He had vomited a number of times during the two days previous to admission and had had no appetite. He was taking fluids only. The amount of urine had diminished.

On January 29, 1929, a lumbar puncture was performed and the result of the examination of the fluid is shown in Table III.

Examination of the urine showed granular and cellular casts, red blood corpuscles and pus cells. There was a large amount of albumin.

On February 13, 1929, a blood urea estimation was carried out and gave 35 milligrammes per 100 cubic centimetres. On this day the patient complained of tender submaxillary glands.

The patient had very slight temporary fever and is still in hospital, apparently progressing favourably.

Case X was not included in Table III, but is worthy of mention.

The cerebro-spinal fluid from it showed an index of 1·33616 and the patient died in uræmic coma. At the *post mortem* examination it was found that both kidneys were almost completely destroyed by tuberculous abscess formation.

The chemical analysis of Fluid Number 49 was not carried out, for it was one of the earliest fluids we examined in respect of refractivity and we had not then appreciated the facts that normal fluids had a relatively constant index and that an endeavour should be made to account for deviations of the index from the normal by means of the chemical analysis.

The value of this method can be illustrated by reference to one or two of the above cases.

The Refractive Index as a Check on the Chemical Analysis.

As far as the substances commonly estimated in the cerebro-spinal fluid are concerned the following rules appear to hold.

1. The refractive effect of low concentrations of those dissolved substances found in the cerebro-spinal fluid is approximately proportional to the concentration.

2. When several of the substances found in cerebro-spinal fluid are dissolved in low concentrations in suitable saline solutions, the total refractive effect is approximately equal to the sum of the individual refractive effects.

Consequently changes in the refractive index should be indicative of changes in the quantity of the dissolved material in the fluid.

If the refractive index is to be used to check the chemical analysis, the following data are required: (i) The refractive index of the normal fluid of man, (ii) the concentrations of the principal constituents of the normal fluid of man, (iii) the refractive effect in weak solutions of the principal constituents of the normal fluid of man.

Provisionally 1·33510 may be accepted as the refractive index at 17·5° C. of the normal fluid of man.

In Table IV is set out the concentration of the principal constituents of the normal fluid of man averaged from the results of various workers.

TABLE IV.

The Content of the Lumbar Cerebro-spinal Fluid in respect of Certain Important Constituents.

	Average. Milligrammes per 100 Cubic Centimetres.	Limits of Normal.
Coagulable protein	23	13–30 milligrammes.
Chlorine (as sodium chloride)..	735	725–750 ,, [1]
Glucose	59	48–85 ,,
Urea	16	3–40 ,,

[1] The lower normal limit for chloride is believed by some workers to be 700 milligrammes per 100 cubic centimetres. Our experience corroborates this. The protein content of several of our fluids from cases of spinal anæsthesia exceeded 30 milligrammes per 100 cubic centimetres (see Table I).

The refractive effect of the principal constituents of the cerebro-spinal fluid has been ascertained.

The value for urea was determined by the use of samples of commercial chemically pure material from three different sources averaged and rounded off to the second place of decimals.

The glucose value was obtained by the use of Merck's chemically pure material.

In Table VI the amount of substance necessary to cause a rise of one scale division, that is, 38·5 units in the fifth place of decimals in the refractive index, is set forth. This value applies fairly accurately over the range 1·33500 to 1·33700, within which the bulk of our work has been carried out.

TABLE V.

Serum protein	0·22% (Reiss) [6]
Sodium chloride	0·22%
Urea	0·27% (0·268), three samples.
Glucose	0·28%

For example, if water gives a reading of fifteen scale divisions, that is, 1·33320, at 17·5° C., 0·22% of

sodium chloride in water will give a reading of sixteen scale divisions, that is, 1·33358. Similarly, 0·22% of serum protein in normal saline solution raises the reading one scale division, that is, 38·5 units in the fifth place of decimals.

It is interesting to apply the above facts to some of the analyses of the fluids in cases of disease of the kidney. By way of illustration, let us take Fluid Number 51. This fluid contained 70 milligrammes of protein per 100 cubic centimetres, while the normal average is 23, an excess of 47 milligrammes. The excess of sodium chloride equals 780 – 735, that is, 45 milligrammes per 100 cubic centimetres. The excess of urea equals 66 – 16, that is 50 milligrammes per 100 cubic centimetres.

If the refractive effects of these excess quantities be worked out and added together, the result will be found to be equal to nineteen units in the fifth place of decimals. If this be added to 1·33510, the normal index, 1·33529 results.

The observed index in the cerebro-spinal fluid from the case was 1·33558, so that the larger part of the chemical deviation of the fluid from the normal was probably not accounted for.

Take as a second illustration Fluid Number 46. In respect of protein and salt it is normal and has almost average values. In respect of urea it has a very large excess, namely, 570 – 16, that is, 554 milligrammes per 100 cubic centimetres, but the refractive effect of 270 milligrammes equals 38·5 units in the fifth place of decimals, therefore the refractive effect of 554 milligrammes equals 79 units in the fifth place. If this quantity be added to the normal reading, 1·33510, a reading of 1·33589 results. The observed reading was 1·33590, so that it may be presumed in this case that the analysis was probably complete and the excess urea represented the only essential chemical deviation of the fluid from the normal.

Take as a third illustration Fluid Number 50 from a patient with acute nephritis. The deviations from the average found in the fluid were: 35 milligrammes of sodium chloride, 50 milligrammes of urea and 58 milligrammes of sugar per 100 cubic centimetres of fluid.

The refractive effects of the above in terms of units in the fifth place of decimals should be as follows:

35 milligrammes of salt	=	6·1
50 milligrammes of urea	=	7·1
58 milligrammes of sugar	=	8
Total	=	21·2

Twenty-one added to 1·33510, the normal index, equals 1·33531, while the observed value was 1·33537, a difference of six units in the fifth place, a reasonably close approximation.

Sufficient has been said to suggest the value of the refractive index to check the correctness and completeness of the analysis and to indicate when other substances known and unknown should be looked for.

The Limitations of the Index as a Check on the Chemical Examination.

The accuracy of the refractive index as a check on the clinical biochemical examination of the cerebro-spinal fluid is limited by: (i) The small fluctuations of the normal index; though it averages 1·33510, it may vary in health as much as eight units from this in the fifth place of decimals. (ii) The clinical estimations have only a limited degree of accuracy.

We believe that while these two factors, taken together, may occasionally cause a discrepancy of as much as twelve units in the fifth place between the observed and calculated indices, nevertheless the average discrepancy when the work is well done is much less than this.

Refractive Index in Meningitis.

In Table VI the results of the examination of the cerebro-spinal fluids in a series of cases of meningitis are set out.

FLUID NUMBER 10.—The meningitis complicated a case of tumour of the brain necessitating repeated ventricular puncture. As far as the refractive index is concerned the fall in chlorides is compensated for by a rise in protein and evidently some other constituent. These results suggest to us the need for further research to find out the other constituent.

FLUID NUMBER 15.—Tubercle bacilli were seen in smears. The fall of chlorides is equal to 205 milligrammes below the normal average, but the protein rise alone or with other rises has kept the index normal. Another instance of compensated deviation.

FLUID NUMBER 19.—The patient was admitted with malignant disease of the pylorus and a meningitis apparently of syphilitic origin. The cerebro-spinal fluid gave a positive Wassermann reaction. It had a rather

TABLE VI.

Serial No. of Fluid.	Nature of Meningitis.	Refractive Index.	Protein, Milligrammes per 100 Cubic Centimetres.	Salt, Milligrammes per 100 Cubic Centimetres.	Cells.
10	Staphylococcal	1·33512	90	600	95, mainly lymphocytes; some polymorphonuclear cells.
15	Tuberculous	1·33512	>100	530	190, chiefly lymphocytes.
19	Syphilitic (in a case with malignant pylorus)	1·33512	80	680	72, chiefly lymphocytes.
33	Tuberculous	1·33531	>100	640	240, chiefly lymphocytes.
34	Meningococcal	1·33542	>100	670	Crowded with cells (lymphocytes and polymorphonuclear cells).
41	? Gram-bacillus isolated from fluid	1·33551	>100	720	80, chiefly lymphocytes.
45	Tuberculous with tuberculous kidney	1·33590	>100	600	150, chiefly lymphocytes.
67	Pneumococcal (Type IV)	1·33593	400 and 418	670	Heavy deposit of pus with many cells, chiefly polymorphonuclear cells.

high protein and rather low salt content. The refractive effects of these deviations from the normal average composition were of such a character as to neutralize each other almost exactly, so that the index was within normal limits.

FLUID NUMBER 34.—The meningococcus was isolated from the fluid on four separate occasions.

FLUID NUMBER 41.—The Gram-negative bacillus was not *Bacillus influenzæ* and it was thought to be a contamination. A second sample of fluid did not show it. The Wassermann test applied to the blood gave no reaction. An earlier sample of cerebro-spinal fluid than that described in Table VI had only 610 milligrammes of chlorine expressed as sodium chloride.

FLUID NUMBER 67.—The protein was estimated by two methods: (i) trichloracetic acid precipitation, (ii) by difference of the refractivity before and after coagulation by heat after adjusting the reaction.

It has recently been shown by Lindner and Carmichael[10] that a fall of chlorides in the cerebro-spinal fluids of patients with tuberculous meningitis may be accompanied by a rise in the bicarbonate. The analyses that have been carried out at the Baker Institute, so far have not been complete enough to enable us to deal with this aspect of the question.

From a study of the table it is seen that meningitis usually raises the index of the fluid, but not invariably so, since deviations from the normal concentrations of different substances may be in opposite directions and so balance one another.

Since drawing up Table VI we have observed a low index (1·33486) in a cerebro-spinal fluid which yielded a positive Wassermann reaction. In this fluid the total protein was 0·04%, chloride 0·57%, glucose 0·054% and urea 0·025%. Fifty cells per cubic millimetre were present and were almost entirely lymphocytes. In this case the fall in chloride was reflected in the fall of the refractive index. This is the only fluid we have examined which showed an almost entirely uncompensated fall in the chloride content.

Jones concluded that in tuberculous meningitis the refractive index was constantly high; we have found it may be either normal or high. The fall of chlorides may be no more than neutralized by the rise in protein and/or other substances. Levinson found the index in this disease could be either high or low. In tuberculous meningitis we have never found it lower than normal. Babes found that acute coccal meningitis might or might not raise the index and our experience agrees with his.

Intracranial Tumours.

The results of the examination of the cerebro-spinal fluids from intracranial tumours are set out in Table VII.

The fluids may be divided into two groups: (i) Those with a normal index; (ii) those with an index 28 to 39 units in the fifth place higher than the normal average. The high readings were always associated with high protein, but the chemical analyses are not sufficiently complete to be properly controlled by the index.

It is hoped that some account of the histology of these tumours will be published at a later date by Dr. Fiddes and Dr. McLean.

The reasons for the difference between the two groups may be that in one group (A) the tumour does not injure the walls of the cavity containing the cerebro-spinal fluid, while in group (B) it does, so increasing the permeability of the sac. Further work is being undertaken on this question.

TABLE VII.

Intracranial Tumours.

Serial No.	Refractive Index.	Coagulated Protein, Milligrammes per 100 Cubic Centimetres.	Chlorine as Sodium Chloride, Milligrammes per 100 Cubic Centimetres.	Nature of Diagnosis and Position of Tumour.
A.F. 7	1·33512	30	730	*Post mortem* — Dorsally in *pons*.
H. 12	1·33512	10	660	*Post mortem* — Glioma left frontal.
B. 20	1·33512	30	710	Clinical—Cerebellar.
C. 36	1·33546	100	730	*Post mortem*—Left frontal anterior pole.
A. 37	1·33549	200	710	*Post mortem*—Cerebello-pontine angle.
W. 53	1·33538	80	740	*Post mortem* — Right frontal.
B. 62	1·33540	240	740	Clinical?
R. 66	1·33512	30	710	Clinical?

Another patient, not dealt with in the table, had a tumour of the *pons* centrally situated and encroaching on the anterior surface as a nodular outgrowth. The cerebro-spinal fluid in this case yielded a refractive index of 1·33511. This tumour distorted the fourth ventricle.

The subjoined notes show that of the three tumours associated with a raised index in the fluid and examined *post mortem*, two definitely affected the meninges, Numbers 36 and 37, while the third, Number 53, may have done so.

One of the tumours, Number 7, invaded the fourth ventricle, but was, nevertheless, associated with a fluid which had a normal index and protein content.

The following are the *post mortem* notes of the tumours macroscopically examined:

Number 7 was a glioma of the dorsal region of the *pons* spreading into fourth ventricle.

Number 12 was a glioma of left frontal lobe with a cyst between the tumour mass and the lateral ventricle.

Number 36 was a tumour of meningeal origin compressing the left frontal lobe, but not invading the brain substance.

Number 37 was a tumour in the posterior cranial fossa involving the meninges and invading the skull in the region of the internal auditory meatus. The left lobe of the cerebellum was compressed but not invaded.

Number 53 was a tumour of the right frontal lobe extending to the *pia mater*.

Our results with brain tumours differ from Molnar's. He believed the index would be useful in the diagnosis of brain tumours, as in his series it was invariably high, varying from 532 to 586 units in the fifth place. He was surprised to find the index did not go parallel with albumin content. Levinson and Serby,[7] on the other hand, found

their fluids from cases of intracranial tumour to have a normal index. As we have seen, their limits of the normal were extremely wide and their series small. There are apparently two definite groups, one with fluids having normal indices and one with fluids having a very definitely raised index. All the fluids with raised index in our series had also a raised protein content.

The results of the examinations of cerebro-spinal fluids in single cases of various nervous and mental diseases are set out in Table VIII.

Spinal block was easily detected by means of the index. To say whether the deviations of the indices in the cases dealt with in Table VIII are significant or accidental, will require much further work. The fluid from one case of Paget's disease of bone complicated by carcinoma of the prostate gave an index of 1·33522; the protein, chlorine and cell content were normal.

Miscellaneous patients incorrectly suspected of having changes in the cerebro-spinal fluid had lumbar punctures performed and the fluids examined. The results are set out in Table IX.

The average index of the above fluids is 1·33510. The average deviation is three units in the fifth place and the extreme deviation six units in the same place. The indices of these fluids lend support to the view that the index of the normal fluid is 1·33510.

Summary.

1. The refractive index of the cerebro-spinal fluid of seven adults about to undergo spinal anæsthesia was remarkably constant, having an average value of 1·33510. The average deviation of the individual observations from this figure was 0·00002 and the extreme deviation 0·00006.

2. A series of nine specimens of fluid from children was examined. Of these two had a definitely abnormal protein content. The average index of the other seven was 1·33508, the average deviation of the single observations from this figure was 0·00003 and the extreme deviation was 0·00005.

TABLE VIII.

Serial No	Refractive Index.	Coagulated Protein, Milligrammes per 100 Cubic Centimetres.	Chlorine as Sodium Chloride, Milligrammes per 100 Cubic Centimetres.	Cells per Cubic Millimetre.	Remarks.
			Spinal Block.		
43	Lumbar. Fluid: 1·33570 Cisternal: 1·33512	100 10	→ 750	— —	Tumour of spinal cord.
			Tabes.		
28	1·33528	30	730	1 lymphocyte.	Wassermann test: No reaction in blood.
			Spastic Paraplegia of Both Legs with Impaired Touch Sensation of Right Arm.		
26	1·33518	Normal	Normal	Normal	
			General Paralysis of Insane.		
0	1·33512	—	—	—	General paralysis; paretic Lange curve present.
			Influenza with Delirium.		
30	1·33528	20	730	1 lymphocyte.	
			Melancholia.		
3	1·33506	30	730	4 lymphocytes.	Melancholia, attempted suicide.
			Mania.		
31	1·33531	100	760	250 and 433 on different samples; chiefly mononuclears.	Evanescent mania with definite cellular reaction and no reaction to Wassermann test in cerebro-spinal fluid.
			Diplopia.		
14	1·33512	—	—	—	Diplopia on looking to right and down.

TABLE IX.

Serial No.	Refractive Index.	Coagulated Protein, Milligrammes per 100 Cubic Centimetres.	Chloride as Sodium Chloride, Milligrammes per 100 Cubic Centimetres.	Cells.	Remarks.
2	1·33504	10	700	Nil.	Miliary tuberculosis, but without meningitis.
4	1·33508	20	720	Nil.	Malaise.
13	1·33512	20	700	5 lymphocytes.	Pyrexia of unknown origin (for a few days).
16	1·33512	20	730	Nil.	Frontal sinusitis?
24	1·33516	30	740	1 lymphocyte.	Infected tonsils (chronic).
74	1·33508	20	720	Nil.	Deaf mutism (acquired).
75	1·33512	10	750	2 polymorphonuclear cells. 1 lymphocyte.	Acidosis in child with probable infective endocarditis.

3. A series of fluids from patients with uræmia showed a high index.

4. Uræmia in diabetics was associated with a very pronounced elevation of the index above the normal, due principally to the high urea and/or sugar content of the fluid.

5. Meningitis is usually, but not invariably, associated with a high index. The fall in chlorides frequently neutralizes the effect of the rise of protein on the refractive index. In one case of syphilitic meningitis a definite fall of the refractive index occurred with a corresponding fall in chloride.

6. Intracranial tumours may be associated with fluids having normal or raised refractive indices.

7. Three cases of *encephalitis lethargica* and two of anterior poliomyelitis were associated with a practically normal index.

8. In two cases of meningism without meningitis, occurring during pneumonia, the refractive index was found to be normal.

9. Spinal block was easily detected by comparing the indices of cisternal and lumbar fluids.

10. Single patients with *tabes dorsalis,* influenza with delirium and acute mania all manifested slight rises of the index.

11. Seven miscellaneous patients incorrectly suspected of having changes in the cerebro-spinal fluid yielded fluids which were normal. Their average index was 1·33510, the average deviation from that figure was 0·00003 and the extreme deviation 0·00006 units.

12. The use of the index as a check on the chemical analysis of the fluid is discussed and illustrated.

Conclusions.

1. The determination of the refractive index of the cerebro-spinal fluid is of value in the diagnosis of many diseases.

2. A definite rise in the concentration of urea or glucose in the cerebro-spinal fluid is associated with a rise in index. If the index be not raised well above 1·33512, uræmic and diabetic coma may be excluded as possible causes of the condition. (The effect on the index of small rises of glucose concentration, such as are obtained occasionally in *encephalitis lethargica,* has not been disclosed in the work recorded.)

3. A large rise of protein concentration is associated with a rise in the index, while a moderate rise may or may not be associated with a rise in the index owing to the compensating effect of the fall of chlorides which so often accompanies it.

4. A fall in chloride is only very exceptionally associated with a corresponding fall in the index.

5. The normal cerebro-spinal fluid of man has an average refractive index of about 1·33510. Deviations from this of >0·00008 above or below the normal average should be regarded as pathological.

6. The algebraical sum of the refractive effects of the deviations from the average normal chemical composition added to 1·33510 should show a rough correspondence with the observed refractive index. If this is not found to be the case, the analysis is probably incomplete or incorrect and further work should be undertaken on the fluid if more be available.

Acknowledgements.

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References.

(1) J. G. Greenfield and E. A. Carmichael: "The Cerebro-spinal Fluid in Clinical Diagnosis," 1925, page 44.

(2) M. Polanyi: *"Beitrag für Chemie der Hydrocephalusflüssigkeit," Biochemische Zeitschrift, Band* XXXIV, 1911, *Seite* 205.

(3) Babes and Babes: "The Human Cerebro-spinal Fluid," Neurological Research Association of the United States of America, 1926, page 321.

(4) E. Palmegiani: "Determination of the Index of Refraction of Cerebro-spinal Fluid," *Revista di Clinica Pediatrica,* Volume XII, pages 273-276, 1914, Volume XII, page 273.

(5) A. L. Molnar: *"Ueber die Refraktion der Menschlichen Lumbarflüssigkeit," Klinische Wochenschrift,* April 23, 1923, pages 790 to 791.

(6) H. P. Jones: "Comparative Studies of Cerebro-spinal Fluids, Especially in Reference to the Refractive Index," *The Medical Clinics of North America*, Volume IX, Number 4, 1926, page 1115.
(7) A. Levinson and A. M. Serby: "The Refractometer and Viscometric Indices of the Cerebro-spinal Fluid," *Archives of Internal Medicine*, Volume XXXVII, 1926, page 144.
(8) B. Wagner: "Wagner's Tables for the Dipping Refractometer," 1907, VIII.
(9) E. Reiss: "*Klinische Eiweisbestimmungen mit dem Refraktometer*," *Verhandlungen der* 76. *Versammlung deutscher Naturforscher und Ärzte*, Breslau, 1904, page 36.
(10) G. C. Linder and E. A. Carmichael: "The Chlorides and Inorganic Constituents of the Serum and Cerebro-spinal Fluid in Meningitis," *Biochemical Journal*, Volume XXII, Number 1, 1928, page 46.
(11) McLean and R. McIntosh: "Studies of the Cerebro-spinal Fluid in Infants and Young Children," "The Human Cerebro-spinal Fluid," 1926, page 296.
(12) Kafka: Neurological Research Association of the United States of America, "The Human Cerebro-spinal Fluid," 1926, page 25.

ACUTE APPENDICITIS.[1]

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WHEN our President, Dr. G. J. Ley, asked me to read a short paper at this meeting, I said to him I considered it a great honour to be asked to speak again, but that I thought somebody else should do so.

I propose to speak on a subject which has been discussed until it is threadbare. We as general practitioners are interested not so much in the rarities of disease, but in those which we meet in the daily round, the common task. Of abdominal surgical conditions appendicitis is far the most common; it is universally recognized to be on the increase and we do not know why it should be so.

I am speaking as a general practitioner to general practitioners. The ever increasing knowledge makes our work more and more complex. It is of necessity carried out by different groups of workers, consultants, medical and surgical, workers of special branches and laboratory workers, all with their special knowledge and special opportunities.

We general practitioners have also our own special knowledge and opportunities. We live with our patients, we can observe disease in all its stages from its commencement to its termination. We learn that our patients are highly complex, each with his own individual outlook and his own individual way of reacting to disease. We know families and can observe the constitutional side of disease, we can watch how the mind reacts not only on the physical side of the patients, but how it affects the actual process of repair and we learn how to guide it. We learn how to handle our patients, when to check them, when to coax them along, when to watch and wait and when to call on the last ounce they have to give. We learn to be keen observers and to obtain a great deal of information by a look, from the aspect of the patients, their speech and their mannerism. As I heard an old doctor once say: "When I go into a room and see a lady put her hand up to her head to tidy her hair I know all is well."

We learn self-reliance and to form a quick judgement. Our training teaches us these things chiefly through the lack of opportunity of calling on purely scientific aid. Lastly, we learn our limitations and when we need to call them in. The decision of treatment rests first in our hands and we have to decide frequently in most difficult cases if the patients have to be treated medically or surgically.

It is universally recognized that no medical treatment is of any use in appendicitis and the treatment is surgical.

Pathology.

I shall first deal with pathology and may I plead for your clemency for a few minutes whilst I go through everyday knowledge.

Appendicitis is an acute infection produced by the invasion of bacteria from the lumen of the appendix into the mucosa and other walls. We need not go into the bacteriology, except to say that the virulence of the invasion varies greatly.

The infection may produce a simple catarrh of the mucosa and slight infiltration of the walls which may completely resolve or partially resolve, leaving the mucosa damaged and partially restricted.

The infection may involve all the coats of the walls, producing a rigid stiff appendix. According to its severity it may produce a simple inflammatory condition either with or without hæmorrhages and this, I conclude, may still completely resolve, but is more likely to produce a damaged mucosa and partial construction of the lumen, interfering with drainage, helping the formation of concretions, rendering the patient more liable to another attack and leaving a focus which may be the starting point of other abdominal conditions.

The inflammation may go on to the formation of pus in the canal or necrosis of the whole or part of the appendix may take place and finally perforation. The infection may extend outside the walls, producing at first lymph and a local peritonitis. This may in time resolve, leaving adhesions which may kink and distort the appendix, or the lymph may mat together the omentum and walls of the bowel, forming a local abscess. This, if small, may resolve, leaving adhesions behind or the abscess may attain a large size and burrow into several situations and finally burst into the general peritoneal cavity or in some other situation. Lastly the infection may be so virulent that no time is given for the formation of any protective barrier and it spreads into the general peritoneal cavity. The future pathology of both groups, local abscess or peritonitis, I conclude depends on two factors. First, the invading bacilli may be completely destroyed or they may be shut up and may at some future date be the starting point of some further

[1] Read at a meeting of the Gippsland Subdivision of the Victorian Branch of the British Medical Association on June 15, 1929.

inflammatory trouble. Secondly, as is well known, if through any cause the function and drainage of tissues or an organ are interfered with, the tissue or organ must suffer accordingly. The whole treatment of appendicitis hinges on these well-known facts.

Statistics.

Dr. Paul Jones, Surgical Registrar of the Melbourne Hospital, has most kindly supplied me with Melbourne Hospital and London Hospital figures and Dr. M. L. Powell, Registrar of the Children's Hospital, through Dr. Begg, of Korumburra, has sent me the figures of the Children's Hospital and I should like to express my deep indebtedness to them.

In the Melbourne Hospital during the years 1927 and 1928, 185 males and 156 females were admitted with acute appendicitis and with no complications on admission. Of these 32 had subacute attacks and seven had attacks which were subsiding. There were two deaths, about 0·5%. Appendicectomy was performed in all, twenty with drainage.

Forty-six had abscess on admission. Of this number twenty-eight were males and eighteen females. Appendicectomy with drainage was carried out in forty cases and drainage alone was carried out in six cases. There was one death.

There were 38 patients with peritonitis on admission, twenty-three were males, fifteen females. Appendicectomy with drainage was performed in 36 cases. There were ten deaths, 27%.

In 175 cases of chronic appendicitis there was one death.

In the Children's Hospital from June, 1926, to 1928 there were 78 patients with acute appendicitis without abscess formation; there were no deaths. There were 68 patients with abscess formation; there were no deaths. There were 14 patients with general peritonitis; among these there were eight deaths, 57%.

The Melbourne Hospital figures of acute appendicitis give a total mortality of nearly 3%. Among those without peritonitis the mortality was 0·5%, with peritonitis 26%. In nearly 20% abscess was present on admission and in 24% drainage was carried out.

The Children's Hospital gives a total mortality of 5%. Among those without peritonitis, both with and without abscess formation, there were no deaths. With peritonitis 57%. Rather more than half the total number had abscess or peritonitis.

The London Hospital figures are as follows: The number operated on within twenty-four hours of onset was 221. There were two deaths or 0·9%. When the condition was treated by watching and waiting in patients who were seen twenty-four hours after the onset, subsidence occurred in 232 instances. Deaths numbered five, a mortality of 2·1%. The number in which delay was unsuccessful, was 109 and there were seven deaths, a mortality of 6·4%. Among the total number of 341 patients the mortality was 3·5%.

In a group of 1,677 patients submitted to immediate operation, inflammation was limited to the appendix in 633, the mortality was six or 0·9%; local peritonitis was present in 467, the mortality was 29 or 6·2%; local abscess was present in 347, the mortality was 16 or 4·6%; general peritonitis was present in 230, the mortality was 47 or 20·5%. In the whole group of 1,677 the mortality was 5·8%.

I think that from these figures we can draw the following deductions, omitting general peritonitis. The returns from both Melbourne hospitals are wonderful and show a high degree of surgical excellence. The difficulty of diagnosis is brought out from the returns of all hospitals by the large number of patients admitted with abscess formation and general peritonitis, namely, nearly 20% in the Melbourne Hospital, rather more than 50% in the Children's Hospital and 34% in the London Hospital.

It is shown too by the large number of patients requiring drainage: 24% in the Melbourne Hospital, 50% in the Children's Hospital. The London Hospital returns do not give the drainage figures, but I conclude that it is quite safe to put them down at least at 34%.

The London Hospital figures go to show that if the patient is seen after twenty-four hours of illness, it is safer to watch and wait; apparently the mortality is slightly reduced.

Diagnosis.

A history, including the past history, should be taken carefully and the actual sequence of events of the present illness should be ascertained: where the pain began, where it is at the moment, whether it is constant or intermittent. Under this heading there are several points which I wish to bring out. From the history and physical signs the actual pathological condition can be determined with moderate accuracy.

All the classical symptoms, vomiting, abdominal pain, constipation, furred tongue, rise of temperature and quickening of pulse, are also the symptoms of the so-called bilious attack which occurs at all ages, especially in children. Parents often ask whether these symptoms are serious or whether they indicate only a slight derangement of digestion. How can you answer the question? I usually say, if the pain remains at one spot, do not give purgatives and send for a doctor immediately. Most attacks of appendicitis start with vomiting and some authorities go as far to say: "No vomiting, no appendicitis." I am certain that some patients have only a feeling of nausea.

Abdominal pain always occurs and by the suddenness and severity of the pain one can estimate to a great extent the virulence of the infection. The locality of the pain is in the right iliac region and the referred pain is umbilical. Frequently and especially in the acute cases pain occurs first over the stomach area to the left of the ensiform cartilage. It then gradually becomes located to the right iliac region.

The character of the pain remains constant; if it ceases fairly suddenly and the patient still looks ill, gangrene has probably taken place; if after the lapse of a period it suddenly comes on again, perforation has occurred.

The bowels are usually constipated, but this is not essential.

In regard to physical signs the aspect of the patient is most deceiving and, I feel confident, depends to a great extent on whether the infection is confined to the walls of the appendix or has reached the peritoneum, absorption into the general circulation then takes place. In the former circumstances the patient looks as if there was something the matter, but he is not ill. Directly the inflammation reaches the peritoneum, absorption occurs and the patient looks ill. The more virulent the attack, the worse the appearance. I wish to stress the point.

In regard to palpation, the first question to decide is the presence of rigidity; this is of vital importance. In the early stages this can be obtained only by the lightest of touch; a heavy touch overcomes the muscular resistance and so rigidity is not obtained. Place the right hand over the left iliac region and the left over the right, then with the flat of your fingers very gently compare the two sides; if in doubt, wait a few minutes and try again. If the infection is confined to the mucosa, probably no rigidity will be obtained. If all the coats are involved and if the inflammation is still confined to them, fine rigidity, easily overcome by firm pressure, will be discovered. If a local abscess has formed, the rigidity will be definite. If peritonitis is present, the rigidity will be quite definite.

In regard to local tenderness, if the mucosa only is affected, the tenderness is quite local and can be covered by the breadth of one finger; the actual appendix can usually be felt.

When all the coats are affected, the tenderness is quite definite and the area is more diffused, but can be covered by an area of two or three fingers' breadth. The situation of the pain is over the course of the appendix, usually over McBurney's point, but it may be chiefly pelvic and sometimes to the left of the umbilicus; the referred pain is umbilical. The appendix usually cannot be made out. If the omentum is protecting the appendix, a definite thickening can be felt. If pus has formed, a definite lump is present according to its situation.

In regard to pulse and temperature, I am sure that it is highly dangerous to form an opinion on variations of these alone. The state of temperature and pulse depends on whether absorption has taken place or not. If no absorption has taken place, very little alteration may have occurred. It is valuable to watch the pulse and temperature carefully to note if there is any quickening of the former or a rise in the latter. Recto-vaginal examination may give most valuable information, if the inflamed appendix is in the pelvis and if pus is located in the pelvis. By this means too other pelvic conditions may be excluded.

As far as differential diagnosis is concerned, it is quite impossible to go into detail in a short paper. The appendicitis which commences with acute pain over the stomach area, may be confused with colic, abdominal crises of locomotor ataxy, acute perforating, gastric and duodenal ulcers and acute pancreatitis.

The previous history will be most helpful. In appendicitis there may have been a previous attack. Gastric and duodenal ulcers and gall stones each have their own special symptoms, but it is well to remember that perforating ulcers are usually of the acute variety and may give little previous warning, also gall stones may be present and give practically no symptoms before colic occurs. Further, acute pancreatitis may have no previous history except a little discomfort or a history of gall stones. The mode of onset in all is sudden acute pain.

The point at which the pain began is important. In appendicitis it may commence in the stomach area, but it gradually goes to the right iliac region. Perforating gastric ulcer pain starts to the left of the ensiform cartilage and may go into the left shoulder. Duodenal ulcer pain starts below the ensiform cartilage. Gall stone colic occurs over the situation of the gall bladder and the pain extends into the right shoulder.

In acute pancreatitis the pain starts over the situation of the pancreas.

Simple colic may occur in any part of the abdomen. The pain in all conditions is constant except in the colics. Patients with perforating ulcers, if seen after a time, may be in the quiescent period and may complain of very little pain.

The aspect of the patient will help. I have already described it in appendicitis. With perforating ulcers the expression is one of anxiety and pain, in acute pancreatitis it is one of collapse, in the colics it is simply that of pain.

The position of the patient is important. In colics the patients frequently writhe about and apply pressure to the painful area. In the others they lie quite still and resent movement. On inspection and palpation the patients with colic are more likely to have free movement and to be supple, though they may have rigidity. The patients with perforation will have a rigid abdomen, except when they are seen in the quiescent period; then they may be supple.

Acute pancreatitis may produce little or no rigidity. The area of maximum tenderness is usually defined over its own special area. I have gone into the question of the temperature and pulse. In a difficult case the pulse may be the deciding factor. In the colics it is frequently quickened, but, if watched, at frequent intervals it will tend to fall. In the other conditions it will gradually quicken.

In the lower part of the abdomen intestinal colic produced by entero-colitis, especially of the

influenzal type, may cause difficulty in forming an opinion. The patients frequently have tenderness over the caecum, but it is usually extended over the whole colon. I am sure these attacks of colic at times light up old foci in the appendix. I remember losing a patient during an influenzal epidemic. I was treating him for what I thought was gastro-enteritis, until suddenly perforation occurred.

Renal conditions likely to be confused are impaction of a calculus in the ureter close to the bladder and infection set up by *Bacillus coli*.

Impaction may take place without any previous renal history and the pain produced may be purely of the right iliac type. On palpation there may be some rigidity, the tenderness on pressure will be quite local, the referred pain over the bladder.

Bacilluria is not likely to be mistaken in babies and small children, as the history is usually that of a quite sudden onset with high temperature and general malaise and no localizing symptoms. Older children and adults usually have a history of frequency of micturition. The pain is either lumbar just under the ribs or over the bladder.

In weighing evidence it is well to remember in the routine examination of women, especially pregnant women, that many have cloudy urine which does not clear on boiling and adding acetic acid and has a trace of albumin. One often wonders when it is or when it is not pathological.

Frequency of micturition and pain on passing urine are also set up by an inflamed appendix close to the bladder and also by other pelvic conditions. In children the most likely conditions to give rise to difficulties are colic, pneumonia, adenitis, either simple or tuberculous, intussusception, acute or chronic. Pneumonia in children practically always commences with vomiting. If the bases are affected, especially if the inflammation extends to the diaphragm, the child may complain of a fixed abdominal pain. The aspect, the high temperature the quick pulse and rapid breathing usually make diagnosis certain.

Adenitis may occur in the mesenteric glands in the same way as in other glands of the body. If the ileo-colic group is affected either in simple or tuberculous conditions, it may be most difficult to diagnose correctly.

I was recently called to see a child who is subject to abdominal pains. The mother said that she had appendicitis. She gave a history of vomiting, fixed abdominal pain in the right iliac fossa and constipation. On examination the temperature was 38·8° C. (100° F.), the pulse rate was 96. No rigidity was present, but definite tenderness was found over the caecum and an ill defined but tender thickening, extending inwards and upwards and then along the course of the aorta. I could make out her appendix which was not tender. I diagnosed adenitis and the condition gradually cleared up.

Tuberculous adenitis, if the same group is affected, may be most difficult. A careful history may disclose a previous alteration in health, perhaps pain over other parts of the abdomen. On palpation the thickening and tenderness may extend upwards along the course of the aorta. Other glands may be felt in the abdomen and physical signs may be found in the chest.

The tenderness and pain over the glands are probably due to inflammation extending to the peritoneum and setting up a local peritonitis.

In acute intussusception the symptoms and physical signs are usually definite. Chronic intussusception both in adults and children may be most difficult to diagnose. There is usually a definite history of sudden acute pain and vomiting; both symptoms may occur at intervals during the course of the next few days or may be very slight. The bowels are usually constipated, but can be kept open with purgatives; blood and mucus may be absent from the motions. There is usually a history of rapid wasting. Palpation usually reveals a sausage shaped transverse colon with a rounded upper edge.

Purpura may simulate appendicitis and it is of vital importance not to make a mistake.

I was treating a young lady who had diphtheria. She was suddenly taken with all the symptoms of acute appendicitis and on examination she had all the physical signs. I was at my wit's end, when I had a happy thought and examined her legs and found purpuric spots. She did quite well.

Carcinoma of the caecum may possibly be mistaken for appendicitis. Nearly all growths are of the cauliflower variety, so are not likely to produce obstruction. The patient will usually give a history of loose and foul smelling motions; frequently colicky pains occur over the caecum. Occult blood and mucus will probably not be present and if the growth is large enough to be palpated, he will usually give a history of alteration in health and will be anæmic.

In women salpingitis, twisted pedicle of the right ovary and tubal pregnancy have to be considered. The patients with salpingitis usually give a history of some uterine trouble or a discharge. On vaginal examination both tubes will probably be enlarged and tender, one may be greatly enlarged, the swelling and tenderness extending from the side of the uterus outwards. The position of pain will be either pelvic or sacral.

If the twist of an ovarian pedicle be complete, it will produce all the symptoms of an acute abdominal condition. If a partial twist is present, the symptoms may not be so acute. On vaginal examination, if the tumour is high up, the finger may not reach it; if the tumour is tense it may be made out on bimanual examination fairly distinctly, but if it is flaccid, it may be difficult to locate with exactness.

Extrauterine gestation before rupture may be most difficult to diagnose, a history of a missed period and of a dull ache, deep in the pelvis, may be obtained or the first warning of anything wrong may be rupture and hæmorrhage. If the hæmorrhage is large, the diagnosis is usually quite definite, but if there is only a partial rupture or leakage, it may be confused with an inflamed appendix in a pelvic situation. The history is usually quite distinct: the woman complains of a sudden acute

pain and faintness from which she shortly recovers, a dull ache in the pelvis remains. This is usually repeated and she shows signs of hæmorrhage. On vaginal examination a very tender fullness is always found.

Treatment.

In coming to a decision as to treatment, we will consider it from the viewpoint of the physician and the actual operating surgeon. By the term physician I include both physician and surgeon, as Sir Berkeley Moynihan frequently points out, a surgeon must be a good physician.

The physician has to decide these points: (i) If it is safe to leave the patient and watch. If so, it is all important that the patient should be kept absolutely at rest, no purgatives and no enemata should be given and nothing should be taken by the mouth except water. (ii) If the patient should be operated on.

In the very mildest appendicitis confined to the mucosa the decision to wait and watch is usually easily arrived at. In the fulminating cases, the definitely acute ones, those with local abscess, perforation and peritonitis are usually quite easy to recognize and call definitely for surgical measures.

The intermediate cases are the difficulty. In the present state of our knowledge, is it possible to be able to prognose with any degree of certainty whether the condition will completely clear up, partially clear up and leave a damaged appendix to be a further source of trouble, whether it will form a local abscess or whether it will perforate and set up peritonitis?

Personally I know no way of answering these questions, yet it is of vital importance for the patient's welfare that these questions should be answered. The medical attendant must bear in mind the patient may pay the penalty with years of discomfort from a focus in a damaged appendix; another attack may occur in unfavourable conditions. If an abscess is formed it may not be possible to remove the appendix and a second operation is necessary. Matting of the bowel and the obstruction are then liable to occur. In the female there may be affection of the pelvic organs and further trouble.

Perhaps with prolonged drainage there will be a weak scar and the possibility of hernia. Peritonitis may occur with its appalling mortality, its after history of chronic pain and ill health and the frequency of early and late complications. This is a formidable list which is of everyday occurrence. It is just to the patient to remember them all.

As far as the operating surgeon is concerned, I take it that the ideals of surgery are either to repair tissues or an organ, so that they can be put to their proper functionary use; failing that, their removal is undertaken and then the ideal is to leave the disturbed structures as nearly as possible in their normal condition. If the inflammation is confined to the walls of the appendix or even completely isolated with the omentum, it is possible to obtain this ideal and also to do other necessary work. If pus or peritonitis is present most surgeons remove the appendix, if it can be done without producing too much trauma, and drain. They are unable to do ideal surgery.

I have given you the figures of the London Hospital. If I may be allowed to put it, it is the school of thought, of watching and waiting. I am absolutely certain that if we general practitioners are going to adopt it, we shall add a good many more regrets to those we all carry. Personally I am not going to adopt it, as I already carry enough regrets.

JENNER'S LIFE AND WORK.[1]

By P. BLACKALL, M.D., M.A.O., M.Ch. (Ireland),
Queanbeyan, New South Wales.

JENNER'S LIFE shows us how a country doctor may so usefully employ his time that he can make valuable discoveries without neglecting his practice.

Dr. Edward Jenner was born in the vicarage of Berkeley in Gloucestershire on May 17, 1749. Very early in life he showed a taste for natural history, as we learn that before he was nine years old he had made a collection of the nests of the dormouse and, when under the tuition of the Rev. Dr. Washbourn, at Cirencester, he spent most of the time allowed for recreation in searching for fossils.

After he had served his time under a surgeon named Ludlow, he spent two years as the pupil of John Hunter. Jenner was then twenty-one years old. Hunter soon noticed that his pupil was observant and reliable and he continued to look to him for help in some of his investigations for several years after Jenner had returned to Berkeley and commenced practice. When Captain Cook returned from his first voyage of discovery, the valuable specimens of natural history which had been collected by Sir Joseph Banks, were in a great measure arranged and prepared by Jenner who was recommended by Mr. Hunter for that purpose. So well did Jenner do this work that he was offered the appointment of naturalist to the next expedition which sailed in 1772, but he refused to accept it. He returned to Berkeley and commenced practice as a general practitioner. He soon acquired a large practice, but in spite of the great demands on his time he continued to take so much interest in natural history that he soon accumulated a large collection of specimens illustrative of comparative anatomy and natural history. He was also devoting part of his time to observations on the cuckoo and on the breeding of toads. He was also engaged in making observations on the heat of animals and vegetables which were published in *The Transactions of the Royal Society* in a paper contributed by Mr. Hunter. Most of these observations were made on animals during hibernation and on

[1] An address delivered at the annual meeting of the Queanbeyan-Canberra Medical Society on July 2, 1929.

vegetables during frosty weather and many of them were suggested by Mr. Hunter.

On March 13, 1788, Dr. Jenner's paper on the cuckoo was read by Mr. Hunter at a meeting of the Royal Society and was printed in *The Transactions* of that year. Many as were the subjects claiming his attention, Dr. Jenner found time to write verse. This he regarded as a recreation and yet he appeared to have grudged the time devoted to it, for in a letter to his friend, Edward Gardner, he writes: "I wish I could give up or at least suspend the little acquaintance I have made with the Muses." Even in his verses one cannot fail to notice his power of keen observation. In illustration of this I will read for you his verse on the signs of rain which was written as an excuse for not accepting the invitation of a friend to make a country excursion:

The hollow winds begin to blow,
The clouds look black, the glass is low,
The soot falls down, the spaniels sleep,
And spiders from their cobwebs creep.
Last night the sun went pale to bed,
The moon in halos hid her head.
The boding shepherd heaves a sigh,
For see?—a rainbow spans the sky.
The walls are damp, the ditches smell,
Clos'd is the pink-eyed pimpernel.
Hark!—how the chairs and tables crack;
Old Betty's joints are on the rack.
Loud quack the ducks, the peacocks cry,
The distant hills are looking nigh.
How restless are the snorting swine—
The busy flies disturb the kine.
Low o'er the grass the swallow wings;
The cricket, too, how loud it sings.
Puss on the hearth with velvet paws,
Sits smoothing o'er her whiskered jaws.
Thro' the clear stream the fishes rise,
And nimbly catch the incautious flies.
The sheep were seen at early light,
Cropping the meads with eager bite.
Tho' June, the air is cold and chill;
The mellow black-bird's voice is still.
The glow worms, numerous and bright,
Illumed the dewy dell last night.
At dusk the squalid toad was seen,
Hopping, crawling, o'er the green.
The frog has lost his yellow coat,
And in a dingy suit is dress'd.
The leech, disturbed, is newly risen,
Quite to the summit of his prison.
The whirling winds the dust obeys,
And in the rapid eddy plays.
My dog, so altered in his taste,
Quits mutton bones on grass to feast;
And see the rooks, how odd their flight,
They imitate the gliding kite,
Or seem precipitate to fall,
As if they felt the piercing ball.
'Twill surely rain—I see with sorrow,
Our jaunt must be put off to-morrow.

In the district in which Jenner practised, there was known a disease amongst the milch cows characterized by the presence of pustules on the teats and udders. It had been observed even before Jenner's time that milkmaids who contracted this disease from the cows usually escaped the small pox. Jenner decided to find out if this were true and, if so, to turn it to practical use. On May 14, 1796, matter was taken from the hand of Sarah Nelmes who had been infected by her master's cow, and inserted by two superficial incisions into the arms of James Phipps, a healthy eight year old boy. The vaccination was successful, so on the first of the following July variolous matter taken from a pustule was carefully inserted by several incisions into Phipps's arm, but no disease followed.

The practice of inoculating the small pox had been practised in England since 1714, as it was found that when it was inoculated the disease was usually much milder than when it was contracted in the natural way. It had, however, the disadvantages that even when the attack was mild, it was communicable and so tended to spread the disease and, further, it was not always mild. Inoculation with cow pox caused an attack that was not communicable and was never so severe as to be dangerous, so that if cow pox was effective in preventing an attack of small pox, the advantages of using it for inoculation instead of variola were great and obvious. It was also obvious to Dr. Jenner that if the cow pox could be inoculated from the pustules on the arm of one human being to the incisions on the arm of another, vaccination would be more easily done, as cows with pustules on their udders were not always available and the practice of inoculating calves so as to get pustules had not then been tried.

In the early years of vaccination most vaccinations were from arm to arm and, if carefully done, they are quite safe, for the clear lymph taken from a pustule that is just ripe, is sterile. However, some vaccinations were carelessly done and permitted contamination of the lymph with blood or matter and in this way disease was sometimes, though very rarely, conveyed from one person to another through the vaccination.

This led to the present practice of always using lymph from the calf that is sterilized by mixing it with glycerine and storing at a low temperature. So effective has vaccination been in preventing small pox, that the majority of doctors now in practice have never seen a case of small pox. To realize how great a blessing the discovery of Jenner has been, one has to have a practical acquaintance with small pox—the most loathsome, fatal and disfiguring disease that has afflicted mankind. Nor has the benefit of it been confined to giving protection from small pox. It was the commencement of a way of preventing or curing diseases that has gone on expanding ever since and appears to be likely to increase in usefulness as time goes on. Jenner vaccinated with small pox modified by passage through the cow and thus protected from small pox without danger to life and without the danger of spreading the disease by having it conveyed to others. The deaths from small pox in pre-vaccination times numbered about two thousand per million. At present the proportion is about one per million.

Jenner's work was suggestive to other scientific men and so we find that Pasteur, by cultivating the

virus of chicken cholera *in vitro* obtained an attenuated virus with which he could by vaccination confer protection against that disease. Later by passing the virus of rabies through a series of rabbits he was able to obtain a vaccine with a greatly shortened incubation period that could be used successfully to protect people who had been bitten, from developing the disease. Other investigators found that by the use of heat or of antiseptics they were able to obtain an attenuated virus that could be used as a vaccine against certain diseases.

Sir A. E. Wright carried the development of vaccines a step further when he showed that the injection of dead bacteria was as efficient as the injection of living ones in bringing about the development of antigens and so conferring a measure of immunity. At present, both living and dead bacteria are used as vaccines as well as bacterial products.

We can well recognize what a great influence the work of Jenner has had on the development of modern medical practice. Up to the present time the very efficient quarantine service that we have in Australia, has led to a neglect of vaccination that may some day become very dangerous, particularly now that the development of aerial travel has made the enforcement of strict quarantine much more difficult. As I have had a good deal of personal experience with small pox, I know how easily the disease is spread even in a partially vaccinated community. If it once obtained a good hold, I doubt if the rapid spread of it through the community could be prevented. The difficulty would be increased by the fact that few members of our profession in Australia have a practical acquaintance with the disease and consequently they would have difficulty in diagnosing the mild infections. I believe that this is a matter that deserves the serious consideration of our health authorities and in fact this was one of the reasons that I have selected the subject for the retiring address of your first President and I felt that it was appropriate that it should be delivered in the capital city of the Australian Commonwealth.

Reports of Cases.

NOTES ON A CASE OF FAMILIAL JAUNDICE.

By JOHN S. SMYTH, M.B., Ch.M. (Sydney),
Warwick, Queensland.

THE incidence of familial jaundice appears to be sufficiently low to warrant the publication of details of such cases as come under notice.

Mrs. T.M., a farmer's wife, *ætatis* thirty-seven years, consulted me first early in April, 1929, concerning her impending confinement. Her family history contains nothing of note, except that her sister suffers from occasional liver upsets, the exact nature of which is not known. Father, mother, brothers and remaining sisters are quite healthy.

Her previous history is as follows. She was married at twenty-two years of age; her first child, a female, was born within twelve months. This child and her second child, another female, born eighteen months later, have remained perfectly healthy and show no evidence of any abnormality whatsoever, being well grown, strong and healthy girls. Her troubles appear to have commenced with the birth of her third child, a male, in January, 1917. Throughout the pregnancy she was, as far as she knows, perfectly well. The confinement was reasonably easy, not unduly long and the baby appeared to be strong and well. On the third day he developed jaundice, became drowsy and would not drink and becoming more and more jaundiced, died on the ninth day.

During the latter end of 1918 she was delivered of a stillborn male infant, prematurely. In September, 1920, a male child was born which appeared quite healthy at birth. On the third day he developed jaundice, which steadily became more pronounced and the child died on the fifth day after birth. Another male child was born in November, 1922, which appearing healthy at birth, developed a severe jaundice on the second day and died on the third day after birth. In April, 1924, a female child was born. This child went the way of the other children after eleven days of extrauterine life, during nine of which she suffered from a progressive jaundice. The eighth child was born on September 28, 1926. In spite of prenatal treatment at the hands of a leading practitioner in Brisbane, the child developed a severe jaundice on the second day and died on the third day after birth.

In no case where death of the child occurred was the birth difficult nor the labour unduly long and at no time during any of the pregnancies did the mother suffer from any untoward symptoms. As far as the mother knows, there was at no time any suggestion that there was any sepsis, umbilical or otherwise, in connexion with any of the children. In May, 1925, her blood was examined by a pathologist who reported a negative reaction to the Wassermann test.

On examination she appears to be a perfectly healthy woman. She is suffering some mental anguish, naturally, because of the almost certain loss of the infant which is due during the first week of July, nine or ten weeks from date. Her heart and lungs appear normal and her kidneys show no evidence of disease or incompetence. The liver dulness is normal, nor is there any liver symptom which can be found on questioning her closely. The fœtus is in the left occipito-anterior position and movements are strong. There is no excess of fluid and the child appears to be normal as regards size. There is in fact nothing abnormal to be found, clinically at least, either in the mother or in the infant which would indicate the tragedy which is certain to occur.

Though the mother presented no clinical evidences of any abnormal blood state, tests carried out at the laboratory of the Commonwealth Health Department at Toowoomba by Dr. Matthew indicate that various changes had occurred in the maternal blood. Tests were made on two dates and the results are tabulated here.

TABLE SHOWING TESTS CARRIED OUT ON THE PATIENT.

Nature.	First Examination, May 16, 1929.	Second Examination, May 21, 1929.
Coagulation time ..	Not done.	Five minutes.
Fragility test	Not done.	Complete hæmolysis in 0·45% saline solution. Trace in 0·47%.
Van den Bergh's test	Positive. Faint. Delayed.	No reaction.
Fouchet test	Positive.	No reaction.
Wassermann test ..	No reaction.	No reaction.
Wassermann test (Husband)	Not done.	No reaction.

A blood film, examined on May 21, 1929, was reported upon as follows:

Erythrocytes: Slight variation in size noted.
Leucocytes: Lymphocytes 26%, polymorphonuclear cells 68%, eosinophile cells 1%, large mononuclear cells 5%. No abnormal forms were seen.

A blood count made the same day gave the following result:

Erythrocytes, per cubic millimetre: 4,400,000.
Colour index: 0·8.
Hæmoglobin value: 77% (Haldane).
Leucocytes, per cubic millimetre: 8,000.

Dr. Matthew comments upon the results of these examinations as follows:

> With the exception of the definitely increased fragility of the red corpuscles, there is not much information of a positive nature to be gained from the examination. The absence of reaction to the Van den Bergh and Fouchet tests on May 21, 1929, are interesting when compared with the faint but definitely positive results on May 16, 1929. It is, I think, a favourable sign, indicating a slightly lessened destruction of red cells, perhaps intermittent, but not of any prognostic significance.

Unfortunately these tests were not repeated, owing to the necessity for the patient's attendance at Toowoomba for the examination. It was impracticable for her to make the journey.

So far as treatment is concerned, at the moment she is being closely watched, her excretory organs are being kept up to the mark, her diet is being regulated and contains plenty of vitamins, together with visceral organs *et cetera*, while iron, arsenic and lime salts are being exhibited.

Since writing the above notes on the history of the patient, the birth and death of her ninth child have occurred.

Labour commenced on June 15, some three weeks before the expected date. The child was born on June 16, labour occupying nearly twenty-three hours due to an early loss of *liquor amnii* and the fact that uterine contractions occurred only at fairly long intervals. The cord was round the child's neck, was very short and circulation ceased before it was possible to clear the cord. The cord measured 27·5 centimetres (eleven inches) from the umbilicus to the implantation in the placenta. Except for these items, the labour was not abnormal. The child, a female, weighing 3·7 kilograms (eight and a quarter pounds), breathed without trouble and appeared perfectly well, crying lustily and having a good colour. It was noted that blood which escaped during the third stage, clotted readily and within the usual time limits. On the evening of the third day the child, which previously had taken drinks readily and had seemed bright, began to get drowsy and refused sips of warm water. An icteric tint appeared first on the soles of the feet and palms and within a few hours had spread over the whole body. The drowsiness and icterus were progressive and on the sixth day the icterus gave place to a waxy pallor which within a few hours became corpse-like in type. The child died on its eighth day of life. Unfortunately no examination of the child was permitted, either by way of a blood film or by autopsy. At no time during the life of the child was there evidence of sepsis or of hæmorrhages. There was no melæna. Liver and splenic dulness did not appear to be increased. The puerperium was without incident.

Comment.

Literature on the subject at my disposal is not extensive. L. Fischer[1] in his book on diseases of infants and children quotes a case which came under his notice, in which four children who were born apparently healthy, died of icterus on the third day after birth. He offers no explanation.

Goodhart and Still[2] quote a series of three deaths in one family and mention another series of six deaths in another family. One autopsy in this series revealed no organic disease.

I. N. Kugelmass and J. E. Tritsch,[3] writing on "Prenatal Prevention of Potential Hæmorrhagic Disease of the New-Born," quote a case in which a woman had five pregnancies, the first four of which terminated in death from hæmorrhagic disease in three new-born infants and possibly also the fourth. The mother came under the care of the authors during the second month of pregnancy (fifth) and by regulation of diet, a living child was achieved. I quote the paragraph regarding treatment in full.

> The treatment of Mrs. T.N. consisted in an analysis of her nutritional habits in order that her corrected food intake might be balanced and adequate and particularly high in varied proteins (6 gm. per kilogram of body weight) and in varied lipins. The visceral organs were given because of their protein phospholipin content in this order: Lung, kidney, testes, brain, heart, pancreas, liver. The acid-forming proteins were neutralised by base-forming fruits and vegetables. Excess of basic salts is requisite for a positive calcium balance as well as for their favourable effect on prenatal development. On this regimen the patient's blood became normal blood, and a normal infant was delivered at term.

Summary.

1. The case is reported as being an example of familial jaundice, one of the lesser known forms of hæmorrhagic disease of the new-born.

2. Of nine children born, the first and second have remained healthy, one was stillborn and six had died from the disease.

3. The cause of the jaundice appears to be due to a degree of hæmolysis in the maternal blood and not, in this case at least, to syphilis of the parents, nor to absorption from a septic focus.

4. Given a sufficiently long period of time before the birth of the child, it would seem to be possible so to improve the maternal blood that a normal child may be delivered.

5. A short period of time is apparently useless for this purpose.

Acknowledgement.

I am indebted to Dr. R. Y. Matthew for his help in making the examinations of the patient's blood and for the loan of a copy of *The Journal of the American Medical Association*.

References.

[1] L. Fischer: "Diseases of Infancy and Childhood," page 48.
[2] Goodhart and Still: "Diseases of Children," page 544.
[3] I. N. Kugelmass and J. E. Tritsch: *The Journal of the American Medical Association*, Volume XCII, Number 7, February 16, 1929.

EXTREME EMPHYSEMA INVOLVING THE GREATER PART OF THE BODY.

By R. A. MONEY, M.C., M.B., Ch.M. (Sydney),
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THE patient, a young boy, four years old, was run over by a motor car whilst playing in the street and admitted almost immediately afterwards to the Royal Prince Alfred Hospital. He complained of pain in his chest and was very shocked. When seen about half an hour after admission he was lying propped up on pillows very distressed and dyspnœic with a respiratory rate of about forty in the minute. He was swollen up all over; his eyes could not be opened; his cheeks were puffed out; his neck was twice its normal size and his thorax was huge for a boy of his age. His colour was, however, good and there did not appear to be any laryngeal obstruction. He was obviously in great pain and was coughing up blood-stained frothy sputum. Palpation revealed the fact that the great swelling was due to extreme surgical emphysema which extended right up the attachment of the *galea*

aponeurotica in his scalp and downwards, all over his thorax and axillæ, abdomen, back, penis, scrotum and into both thighs; it was increasing whilst the patient was under examination. Beyond some slight bruising about the costo-vertebral angles of the fourth and fifth ribs on his left side there were no localizing signs indicating the origin of the emphysema; he was very tender all over and the ribs could not be felt on account of the swelling. The breath sounds were obliterated by the crackling of the air in the tissues; his thorax was resonant all over, but a faint cardiac impulse could be felt somewhat inside the normal situation. He was too ill to be examined by X rays or even moved. In case a closed pneumothorax was developing under positive pressure on his left side, a needle was inserted into the left pleural cavity from the axilla; no air escaped from the pleural cavity, but on withdrawal of the needle from the skin air began to rush out through the puncture.

He was then given a hypodermic injection of morphine four milligrammes (one-sixteenth of a grain) and under local anæsthesia in the bed a small incision was made through the skin and deep fascia just below each clavicle. The effect was dramatic. With a rush of air and a little bleeding the patient went down like a balloon and in a few minutes he was sleeping peacefully. A light gauze dressing only was applied to allow the continued escape of air.

The next day some air still remained in his tissues, but his condition was excellent. His eyes could be opened and he was still coughing up some blood-stained sputum. Except for a temperature which fluctuated between normal and about 39° C. for a few days, he made an uneventful recovery and was discharged entirely free of emphysema two weeks after admission. A complete X ray examination a week after the accident failed to reveal any signs of abnormality in the thoracic wall or its contents and it can only be presumed that the air escaped from the trachea or main bronchi *viâ* the mediastinum. A similar case with normal X ray findings was reported by Dr. John A. C. Macewen in *The British Medical Journal* of November 17, 1928.

Reviews.

LOCAL ANÆSTHESIA.

GASTON LABAT has written a beautifully and expensively illustrated book of 567 pages on the subject of what is popularly called local anæsthesia, though he does not use this term.[1] He confines his attention to nerve block and field block methods and does not favour or even consider local infiltration of the field of operation, although this method is widely and successfully used in conjunction with the other two methods by operators of great experience.

We note on page 8 a remark that "isotonicity is based on sodium chloride content only." This is not physiologically correct, though in the clinical use of analgesic solutions it may be regarded as sufficiently correct for working purposes.

Labat now recommends for general purposes an adrenalin strength of five drops (of one in a thousand solution) per hundred cubic centimetres of analgesic solution. This is equal to something like one in 300,000, considerably weaker than he used to recommend a few years ago. If we remember rightly, he used to recommend a strength of one in 100,000.

He believes in the routine use of morphine and scopolamine (hyoscine) before operation, though as a rule he prefers a relatively small dosage.

He makes very light of the difficulties and risks of paravertebral anæsthesia, a method which he recommends for routine use. No doubt he is justified by his own experience, but in view of reports from periodical literature we doubt the wisdom of this advice. He also favours the posterior route for splanchnic anæsthesia and here, too, we think a similar criticism is justified by the records of other people's experience.

On the other hand, Labat makes it appear that Braun's anterior splanchnic method is surrounded by great difficulties, so great that it has very little to recommend it. Perhaps Labat's criticism is unconsciously influenced by the fact that he is himself not an operating surgeon and on that account has had little or no personal experience of the technique, whereas Braun is an operating surgeon of great experience.

As regards nerve blocking methods for perineal surgery, we are sure Labat is out of date. No one who has given Labat's posterior sacral method a good and fair trial, the caudal block a good and fair trial and Braun's anterior sacral method a similarly good and fair trial, will fail to come to any other conclusion. Labat gives his tedious posterior sacral method twenty-one pages of detailed attention, with ten fine illustrations. He gives the caudal block twenty-six pages with nine illustrations and then gives the newer method four pages with three illustrations, wherein he thinks of every imaginable fault. He will tolerate it only to this extent, that it is "desirable that its technique be mastered so that the procedure may be used if pathological conditions of the posterior sacral region should render transsacral block impracticable and other serious considerations make subarachnoid block (spinal anæsthesia) inadvisable."

He devotes a chapter of forty pages to the discussion of spinal anæsthesia. In the employment of this method he is bolder than many surgeons, for he advocates injections as high as between the twelfth dorsal and the first lumbar vertebra for some purposes. We think he is an optimist. We must say quite frankly that his advice as regards these higher sites of injection should be received with considerable caution and should not be followed in any but most exceptional cases and never by novices.

We have criticized some of Labat's teaching as not the best, but as for the rest of the book, we have the highest commendation. He is most precise and complete in his directions. His descriptions of technique are wholly admirable and the illustrations surpass anything to be found in any other book on the subject.

[1] "Regional Anesthesia: Its Technic and Clinical Application," by Gaston Labat, M.D.; with a Foreword by William J. Mayo, M.D.; 1928. Philadelphia: W. B. Saunders Company; Melbourne: James Little. Royal 8vo., pp. 584, with illustrations. Price: 37s. 6d. net.

LABORATORY WORK IN TUBERCULOSIS.

THERE has been so much work done on the laboratory diagnosis and the experimental study of tuberculosis that the necessity for further text books on the subject at the present time might be questioned. "Laboratory Diagnosis and Experimental Methods in Tuberculosis" by Henry Stuart Willis of the Johns Hopkins University and Hospital does nevertheless meet a need and fill a gap in text books written in English.[1] The author explains that the guiding principle has been to cover the subject as concisely as is consistent with adequacy of presentation.

The book is divided into five parts. The first deals with general considerations of the body fluids and excreta, the second with bacteriological diagnosis, the third with diagnosis by use of tuberculin, the fourth with serological diagnosis including a chapter on tuberculo-complement fixation by J. Stanley Woolley and the fifth with some methods of value in studies of tuberculosis experimentally produced.

Most of the methods outlined have been proved dependable through long application and only a few have been included which are new and virtually untried. The book has brought together within a single volume numerous and diversified methods and the unspecialized worker is

[1] "Laboratory Diagnosis and Experimental Methods in Tuberculosis," by Henry Stuart Willis; 1928. London: Baillière, Tindall and Cox. Royal 8vo., pp. 355, with illustrations. Price: 16s. net.

assisted by the appraisal of these methods by the author. That part of the book dealing with the principles and procedures of experimental methods in tuberculosis will be most appreciated by the specialized worker and by him who is just entering the field of tuberculosis reasearch. A bibliography of two hundred and forty-three references greatly adds to the value of the book.

Dr. Willis has succeeded in making a concise and clear statement of his subject. The book should prove of definite value to medical practitioners, public health officers and laboratory workers. It is unfortunately not free from typograhical errors.

THE PROTECTION OF WOMEN.

"DIFFICULT DAUGHTERS" is a booklet of forty-seven pages written by Jessie March who is engaged in rescue work in London.[1] It comprises sections entitled "The Unmarried Mother," "The Love Child," "Adoption," "Venereal Cases," "The Girl on the Street," "Sexual Offences Against Young Persons," "Drink and Immorality," "What Children Can Tell Their Parents" and "Why Publish the Letters." She pleads for hostels where unmarried mothers may work until their children have been weaned. She commends the *Adoption of Children Act* (1926) which, "while not making illegal the voluntary adoption of infants, does establish certain safeguards," such as legal sanction of adoption and registration.

With regard to venereal disease the author advocates hostels so that those infected may be isolated and yet able to work.

As a preventive measure against prostitution she advocates raising the age limit for compulsory education from fourteen years to sixteen in order to keep girls off the streets.

She advocates the hearing of cases of sexual offence *in camera* and separate waiting rooms at the court for children.

As can be seen, the booklet is extremely practical in nature and the recommendations mentioned are only some of the concrete suggestions that the author makes.

Analytical Department.

"BEMAX."

AFTER every new discovery involving a new principle there has been an attempt to extend the application far beyond its original limits. These uncritical attempts often savour of exaggeration and may even threaten to bring the whole principle into disfavour. Since Starling introduced the conception of chemical messengers which he called hormones, and enunciated the principle governing the action of the secretions of the ductless glands, many ingenious, but scientifically untrained persons have suggested uses for glandular extracts without any physiological data on which the suggestions could be based. Similarly the recognition of the accessory food factors by Gowland Hopkins and the work done by Funk and many others have stimulated speculators to attribute almost all ills to which human flesh is heir, to a lack of one or other vitamin. If all that has been written by the food faddist and by many others on this subject were true, it would be inconceivable that any human being enjoyed good health before vitamins were discovered. There is no need to go beyond the doctrines of modern physiology. Under rare circumstances people are given diets seriously deficient in the qualities spoken of as vitamin *A*, *B*, *C*, *D* or *E* and suffer on this account. Usually, however, the diet suffices to keep people in perfect health. It is little wonder that if members of the medical profession in almost every country claim that additional vitamins are needed for all kinds of ill health, the chemical manufacturer should flood the market with preparations containing or reputed to contain one or other of the vitamins. There appears to be a demand on the part of the medical profession and of the public for these preparations. While we doubt whether there is any real necessity for these preparations, we have undertaken to investigate the vitamin content of a few, in order that medical practitioners wishing to employ accessory food factors in treatment, may be guided in their selection of a preparation.

"Bemax" is stated to be a preparation of cereal germ. It is prepared by Vitamins, Limited. It is said to be detoxicated and is probably defatted. It resembles fine wheat bran and has a pleasant nutty flavour. The firm advertises this preparation in accordance with usage in connexion with vitamin containing products. We have submitted samples to our analyst who has carried out experiments on rats to ascertain whether the claim made by the manufacturers on behalf of "Bemax" can be justified or not. Our analyst reports as follows:

It is claimed by the manufacturers that "'Bemax' contains more natural *B* vitamin than any other known substance." This point has been tested by feeding experiments on white rats. Young rats were fed on a diet consisting of purified casein, butter fat, starch and a salt mixture. This diet was shown to produce rapid loss of weight and death and is vitamin *B* free. When the weights of the rats had shown a definite decline on this diet, the animals were divided into three groups of three each. The same diet was continued, but each of the rats in Group I received 0·5 gramme of "Bemax" per day, each of the rats in Group II 0·5 gramme of dried yeast which had been shown to be rich in vitamin *B* and the rats in Group III were given 0·2 gramme of a commercial yeast extract per day. All the animals commenced to increase in weight at once. The feeding was continued for sixty days. The average increase in weight per rat in the groups was: Group I 78 grammes, Group II 66 grammes, Group III 57 grammes.

In another series the rats were given the same basal diet, but 5% of "Bemax" and yeast respectively were added to the diet. This experiment was seriously interfered with by a very cold spell which killed a number of young rats, so that only one rat was left in each group. In forty-three days these had increased in weight respectively "Bemax" 62 grammes, yeast 52 grammes.

The average increase of three rats of similar age and weight kept on a diet of whole wheatmeal and "Lactogen" was 104 grammes.

These experiments are sufficient to show that "Bemax" is very rich in vitamin *B* and is better than a good grade of dried yeast. The claim that "Bemax" contains more vitamin *B* than any other natural foodstuff is probably correct. The amount of "Bemax" recommended for an adult per day is one tablespoonful, about fifteen grammes. It would be difficult to take fifteen grammes of dried yeast or its equivalent of wet yeast.

In these experiments by vitamin *B* is understood the vitamin *B* complex, that is a mixture of vitamin B_1 and vitamin B_2. No attempt has been made to estimate the relative proportions of these two factors in "Bemax." Wheat embryo is known to be rich in vitamin B_1 or antineuritic vitamin, but poor in vitamin B_2 or pellagra preventing vitamin, while yeast is rich in both.

Where it is considered necessary to give increased amounts of vitamin *B*, this can undoubtedly be done by the administration of "Bemax."

The preparation has a slightly laxative effect probably due to its high cellulose content.

One may doubt the necessity for such a preparation as "Bemax," except under very special conditions. Those persons suffering from the effects of deficiency of vitamin *B* in the diet would be benefited by taking a better and more varied diet which will provide ample vitamin *B* in addition to other essential foodstuffs.

It may therefore be concluded that "Bemax" is a preparation containing an unusually large amount of vitamin *B* and that it can be recommended on this account.

[1] "Difficult Daughters and Some of Their Problems)," by Jessie March; 1929. London: John Bale, Sons and Danielsson, Limited. Crown 8vo., pp. 47. Price: 6d. net.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 28, 1929.

The Hazards of Child-Birth.

THE attention of the medical profession as well as of the public has been directed during the last five or six years to the highly unsatisfactory records of obstetrical practice in nearly every country in the world. In Australia the maternal death rate and the loss of infant lives are admittedly much too high. Much has been written on this important matter. It has been the subject of reports and inquiries and around it speculation, incrimination and invective have been gathered. The blame has been placed almost indiscriminately on the shoulders of the medical practitioner, of the teacher of obstetrics, of the midwives and obstetric nurses, of the mothers and of the race. Certain facts are available. The whole truth, however, has not yet been disclosed. There has been, perhaps, rather too implicit a dependence on orthodox doctrines and accepted dogmas. A natural tendency has been manifested by the medical profession to explain away some of its responsibilities and to hide itself behind an argument concerning the difference between the physiological and the pathological aspects of pregnancy, parturition and the puerperium. No substantial progress will be registered until a fresh, impartial and complete inquiry has been instituted and all the evidence has been weighed *de novo*. All the facts should be ascertained and arranged. This is the only scientific and reliable method of attacking any important problem. When the facts have been marshalled and their real significance determined, it should not be a difficult matter to devise a remedy for all the avoidable defects which have led to unsatisfactory results.

The Department of Public Health of New South Wales has recently started an inquiry into some of the problems connected with maternal mortality and the mortality of infants under one month. That this investigation is worthy of the fullest support of the medical profession goes without saying. If any criticism were offered, it would be that the investigation does not appear to be sufficiently comprehensive. In order that all the facts attending the death of every mother in the State of New South Wales who loses her life as a result of her pregnancy or confinement and full information concerning the death of every fœtus or infant under one month may be ascertained, the Director of Maternal and Baby Welfare is seeking the assistance of the medical practitioners throughout the State. Two forms are being supplied to medical practitioners and they are being requested to fill in as many of the details as are within their knowledge whenever a mother or her babe dies. It is emphasized that the information gained through these reports will be used exclusively for statistical and scientific purposes and that it will be regarded as strictly confidential. Dr. E. Sydney Morris realizes that some of the data could be supplied with greater ease by nurses or by the patient's relatives than by the medical practitioner in attendance, but he has no desire to go behind the back of the doctor. He therefore approaches the medical attendant in the first place and relies on his public spirit, his keenness and his desire to contribute to a reduction of the wastage of the lives and health of mothers and their babies. He is aware that medical practitioners dislike clerical work and endeavour to escape the burden of having to write replies to many questions on forms. He points out that the task he is imposing on his colleagues is a voluntary one and that if they refuse to undertake it or permit unreasonable delay to take place, he has no power to force them. He relies solely on the willing cooperation of the medical profession. In these circumstances he proposes to give medical practitioners the opportunity to supply the desired information. Should they fail, he will be compelled to use other channels for the evidence. We reproduce the questions in another part of this issue.

It will be remembered that in their report the Royal Commissioners on Health recommended that the cooperation of the general medical practitioner with the health departments should be enlisted and

that certain duties should be imposed on individual medical practitioners who would be paid fees for the work. No attempt has been made to impose a legal obligation on medical practitioners to assist the health authorities. It might, perhaps, have been a wiser move had steps been taken to compel medical practitioners to keep the necessary records and to transmit the data to the departmental authorities. A special form might have been drafted suitable as a general record for medical practitioners attending women during pregnancy, parturition and the puerperium. If the department had supplied these forms to every medical practitioner and he was required to enter all the available information, even when the process remained physiological and uncomplicated, the department would have had access to some very valuable information which could have been utilized in a thousand and one ways. The Department of Public Health of New South Wales has not adopted an expedient of this kind and is satisfied to invite assistance on a voluntary basis and to restrict the evidence sought to the circumstances surrounding the death of either the mother or the infant. Since the medical profession is not kindly disposed to compulsory measures and since the limitation of the inquiry lessens the clerical and investigational work, the invitation of the Director of Maternal and Baby Welfare should meet with a ready and willing response. It is hoped that he will not be disappointed. The inquiry should bring to light all the facts contributing to the deaths and should result in the accurate tabulation of the preventible and the inevitable loss of life and health. We trust that similar investigations will be undertaken in all the Australian States and that the results will be pooled. An impartial and critical examination of the replies, properly collated, would provide the best starting point for the overdue reform in obstetric practice.

Current Comment.

APPENDICITIS.

THE subject of appendicitis has by no means been worn threadbare. As will be shown presently, it still engages the earnest attention of surgeons in different parts of the world. The condition holds much interest for Australian practitioners of medicine. In the older parts of the world, where population is dense, surgeons of experience are as a rule within easy reach of the patient and hospital facilities are available. In Australia the general practitioner in the country is often compelled to operate in abdominal emergencies when he has perhaps had little experience of abdominal surgery. The wise and well considered contribution to this week's issue by Horace Pern will therefore be read with interest. He writes as a general practitioner for his brother general practitioners. His opinions are the result of many years of practice in the country. He is strongly opposed to the policy of "watching and waiting." That he is justified in his attitude is shown by a recent communication by R. Warren.[1]

Warren states that the total death rate "for the disease" is not diminishing in Great Britain in spite of the advances of surgery and that in the United States of America the rate increased 30% during the first twenty years of the century. In the British Isles the mortality per million in 1913 was 69, in 1927 it was 70. In the United States of America in 1901 the mortality per million was 110 and in 1921 it was 144. He asks whether the increasing mortality is due to expectant treatment and states that this seems hardly likely as judged from the figures taken from institutions where this form of treatment is practised. He regards it as more probable that the disease has become more common or more severe in character. Allowance must be made for the fact that the figures quoted are for different periods. It must be realized that the figures give no indication of the case mortality. Thus if appendicitis occurred more frequently in the British Isles in 1927 than it did in 1913, the case mortality on Warren's showing would be less. Without figures regarding the incidence of appendiceal inflammation the mortality rate per million does not give much useful information. Warren does discuss case mortality, for he gives the percentage mortality for appendicitis for the London Hospital for 1900 as twenty-seven and for 1914 as six. A comparison between these figures and those for the mortality rate per million for 1913 and 1927 cannot be made. Warren attributes the improvement to early operation and better after treatment, particularly the use of Fowler's position. It could not be claimed that there have been since 1914 any material advances in methods of treatment which would bring about a further reduction of any great magnitude. Such methods as ileo-colostomy with caecostomy advocated by Handley for use in acute peritonitis would be applicable so seldom that they need not be considered in this connexion. The figures given by Pern for the London Hospital are interesting, but he does not state to which year or years they apply. The only way in which it would be possible to

[1] *The Lancet*, July 6, 1929.

determine whether the disease has become more common or more severe would be to undertake an analysis of all patients admitted to all the hospitals of a large area over a long period and to correlate the resulting figures with the pathological findings in all patients submitted to operation.

The next point to be considered is that of expectant treatment. It is largely due to the influence of Ochsner that a policy of watching and waiting is adopted in some clinics as a routine, when the patient's condition does not call for immediate operation. Warren points out that the main point at issue is the treatment of patients whose inflammation has been in progress for some time. He states that all surgeons are agreed that immediate appendicectomy is the safest course in the early stages. The figures given by Pern would suggest that waiting is the safer course when the patient is not seen until more than twenty-four hours have elapsed. Warren gives similar figures. Among 341 patients treated by the expectant method at the London Hospital the mortality was 3·5% and among 214 treated similarly at Saint Thomas's Hospital the mortality was 4·2%. Among 1,677 patients operated on immediately at the London Hospital the mortality was 5·8% and among 901 operated on without delay at Saint Thomas's Hospital it was 8·4%. Warren is quite right when he states that patients treated by the expectant method are to some degree selected. This lies at the root of the matter. At both the hospitals from which the figures quoted were obtained, many more patients were operated on without delay than were watched. The first group would include all those whose inflammation was of the acute fulminating type, and all those who had been allowed to remain too long before being brought under medical supervision. The two methods are not really capable of comparison. Warren is undoubtedly correct when he states that early diagnosis and operation are the counsels of perfection.

If it be granted that all medical practitioners are seized with the need for immediate operation when appendicitis is diagnosed, which is doubtful, there is another factor to be considered and that is the delay which occurs between the onset of symptoms and the seeking of medical advice. This is largely a question of educating the general public to realize the way in which to recognize danger signals and the folly of temporizing. This is specially necessary in regard to children. It is known that the mortality from appendicitis among patients under fifty years of age is highest among children under the age of ten and particularly among those under five. The giving of aperients may aggravate early acute appendicitis. This is where the general practitioner can do useful work. He has the unrivalled opportunity of teaching mothers in matters relating to the health of their children. His instruction should be frankly given, it should be definite, but should not be given in a way calculated to alarm parents. As far as treatment is concerned, operation will be undertaken as soon as other conditions have been excluded and a definite diagnosis is made. As a rule there will be little difficulty with the operation. Occasionally trouble may be encountered. It is not intended to discuss at present the way in which these may be overcome. An excellent account by H. B. Devine of the procedures to be adopted in difficult appendicectomy will be found in the issue for March, 1929, of *The Journal of the College of Surgeons of Australasia*. This may be taken as a safe guide.

THE CARRIER PROBLEM IN DIPHTHERIA.

AN interesting report has recently been made by L. W. and R. J. Cann of an attempt to deal with the carrier problem at Guy's Hospital, London.[1] At the request of the London County Council an out-patient clinic for the investigation and treatment of school children who were diphtheria carriers, was started in July, 1926. It was decided that all children from whom diphtheria bacilli were recovered by swabbing one month after the onset of the illness, should be regarded as carriers. This time appears to be unnecessarily short, for it is a common experience that many children take longer than this to become free from virulent organisms. Children to the number of 140 were transferred to the clinic, 18 yielded diphtheroids, 49 yielded *Bacillus hoffmanni*, three yielded unclassified diphtheroids, 19 yielded Klebs-Löffler bacilli which were of doubtful virulence or non-virulent and in five the virulence was not tested; 46 yielded virulent Klebs-Löffler bacilli. Of the 46 only 25 satisfied the definition of carrier. Of the 25 carriers 11 had organisms in the nose only, one had the nose and ear, eight had nasal and tonsillar involvement and five had tonsillar involvement only. Apparently the five children yielding diphtheria organisms whose virulence was not tested, were neglected; no mention is made of them. It must be stated, however, that great difficulties were experienced in securing attendance of patients. As has been reported by other observers, it was found that the majority of carriers had some pathological condition which suggested that the organisms were living in a saprophytic state, but the same pathological conditions were found in children with no diphtheria organisms. Nasal infection was the most difficult to eliminate; douching and painting were used and in some instances a polyvalent Klebs-Löffler vaccine was injected. Tonsillectomy was necessary in only one instance. It is concluded that the advantages to be gained by eliminating carriers would probably be few, because susceptible children would still be exposed to infection. Schick testing and immunization is recommended as cheaper and simpler. The constant and efficient detection of carriers of school age may be cumbersome, but it is necessary until all susceptibility is eliminated.

[1] Guy's Hospital Reports, July, 1929.

Abstracts from Current Medical Literature.

SURGERY.

The Injection Treatment of Varicose Veins.

L. A. GREENFELDER AND R. I. HILLER (*Surgery, Gynecology and Obstetrics*, May, 1929) combine a clinical and a laboratory study of the injection treatment of varicose veins, undertaken for the purpose of evaluating the methods. In experimental studies conducted on dogs with 20% sodium chloride and 50% glucose solution as sclerosing agents for the obliteration of veins, it was found that the sodium chloride solution was more effective than glucose, but more irritating when injected extravascularly. There was apparently no difference in the structure of the thrombi or their adherence to the wall of the vein; only one thrombus was obtained following glucose injection, whereas thrombi developed uniformly following sodium chloride injection. When the irritative process extended through the entire thickness of the wall of the vein, the elastic tissue of the media was especially liable to destruction. The effect on the elastic tissue was more pronounced in the veins injected with sodium chloride than in those injected with glucose. The clinical technique and complications are discussed. A case of auricular flutter developing after injection of ten cubic centimetres of a 20% sodium chloride solution is reported. After a comparison of the results obtained by operation with those obtained by the injection of sodium chloride solution in the treatment of varicose veins in men, it is felt that the injection treatment offers many advantages over operative treatment and yields as good if not better results than those obtained by operation. The results from the use of sodium chloride in women have not been as satisfactory as those in men.

Raynaud's Disease.

A. W. ADSON AND G. E. BROWN (*Surgery, Gynecology and Obstetrics*, May, 1929) write on the physiological results of the treatment of Raynaud's disease by resection of the upper thoracic and lumbar sympathetic ganglia and trunks. Medical literature is filled with varying reports and this will continue until knowledge of the anatomy and physiology of the sympathetic nervous system has become firmly established. The ætiology is unknown in the idiopathic or primary types of the condition. The influence of heredity has not been striking, but the subnormal vasomotor types seem definitely of a constitutional nature. Of the patients 80% were females and in the Mayo Clinic figures the males represented only about 5% of the total number. The average age was thirty-one. The primary objects of treatment can be considered to be twofold: first, to remove if possible the exciting factors; second, to block or produce interference in the vasomotor paths which supply the affected areas. In the mild types without pain or trophic disturbances considerable relief is frequently obtained from protection from cold by occupation and clothing. The blockage of the vasomotor path to the part has been the goal long sought. In five cases of vasomotor neurosis of the spastic type with symptoms there was definite and maintained vasodilatation for periods as long as three years following operation. Vasomotor activity as measured by the surface temperature was absent or definitely diminished with complete relief from the symptoms and signs of the disease. Cervical sympathetic ganglionectomy by the anterior approach, carried out in two cases of Raynaud's disease of the hands, was unsuccessful in producing vasodilatation or in ameliorating the signs or symptoms. Intrathoracic sympathetic ganglionectomy by the dorsal approach was successful in two cases of Raynaud's disease of the hands, producing dilating effects on the arteries of the hand comparable to that observed in the feet following the lumbar operation. The striking, maintained and unequivocal effects of lumbar and dorsal sympathetic ganglionectomy in Raynaud's disease seem to warrant the belief that surgical control of this disease is an accomplished fact.

Local Anæsthesia in Upper Abdominal Surgery.

CHARLES A. PANNETT (*The Lancet*, February, 1929) in a Hunterian lecture on local anæsthesia in upper abdominal surgery states that the post-operative state of a patient after an upper abdominal operation under local anæsthesia is far better than after general anæsthesia is used. Four methods are advisable. Successive local infiltration of structures before they are divided is not successful in abdominal operations. The author has devoted much time and attention to paravertebral anæsthesia and, although the anæsthesia, if successful, is perfect, he has discarded the method as a practical solution of the problem. Splanchnic anæsthesia combined with anæsthetizing of the anterior abdominal wall is best done by the anterior method, with the aid of a little general anæsthetic. The posterior method without general anæsthesia is successful in only 50% of cases. The author describes a modification of Braun's technique. These operations can be carried out with safety by high spinal anæsthesia and there is a large field of usefulness for this method. After discussion of spinal anæsthesia in general, the choice of anæsthetic agent and the dangers of spinal anæsthesia, the technique is given. The author concludes that this method of high spinal anæsthesia, if a careful technique be followed, is accompanied by very little risk. It possesses many advantages over general anæsthesia reducing to a minimum shock and post-anæsthetic vomiting. It is not recommended as a routine procedure. The method described has not reached finality, but it is thought that it could be used more frequently with advantage.

Caecal Diverticulosis.

L. A. GREENFELDER AND R. I. HILLER (*Surgery, Gynecology and Obstetrics*, June, 1929) write on the subject of caecal diverticulosis in special reference to traumatic diverticula. Solitary caecal diverticula may produce symptoms of acute or chronic appendicitis necessitating operation. Their presence should be expected if appendicectomy has previously been performed and symptoms return. The ætiology of the primary type of diverticulum is still a matter of conjecture. An extensive study, covering observations on 5,385 major operations and 400 autopsies on adults performed at the Michael Reese Hospital, has yielded four cases of traumatic solitary caecal diverticulum. Illustrations are presented to demonstrate ætiological factors and possibilities in the formation of these diverticula; eversion of the caecum between two constricting adhesive bands, traction of a narrow adhesion, eversion of the stump site as a result of weakness due to the migration of a silk purse string suture into the caecum and eversion at the stump site as a result of weakness following the rupture of a stump abscess into the lumen of the bowel.

Gastro-Jejunal Ulcer.

GUTMANN, JAHILL AND THEODORESCO (*La Presse Médicale*, March 20, 1929) give an account of the study of twenty post-operative peptic ulcers from the clinic of Professor Gosset. They found that its frequency was 1·5% in one thousand gastro-enterostomy operations for gastric and duodenal ulcer. The date of appearance varies from ten days to twenty years after the operation, generally from six months to two years. Clinically, the most important symptom is the pain which is exceptionally violent and is not amenable to ordinary therapeutic methods. The pain occurs regularly during the day, usually four or five hours after a meal. It also occurs at periodic intervals during the year, the duration being from ten days to one month, generally three weeks. As time goes on the intervals become shorter. The site of the pain aids the diagnosis; it is usually situated to the left and below the umbilicus. Vomiting may occur, but is uncommon. Melæna and hæmetemesis may occur. Little information is gained from physical examination. The patients do not lose their appetite, but rather are afraid to eat on account of the pain. Left to itself, peptic ulcer has a natural tendency to fistula formation with a neighbouring organ, generally the colon. In rare cases ulcers may perforate. In some cases jejuno-colic fistula had not been detected even by X ray examination prior to operation. The adhesions

which occur in certain instances, may form a pseudo-tumour. When a patient begins to complain of trouble some weeks or months after operation, it may be due to conditions such as gastritis *et cetera* which existed prior to operation, to activity of the former ulcer or the formation of a gastro-jejunal ulcer. Of these the gastro-jejunal ulcer is remarkable for its intense pain; the localization of the pain differs. In certain cases sudden severe hæmorrhage occurs after months or years and at *post mortem* examination recent ulcers, frequently multiple, are found. In rare instances no local cause for the hæmorrhage can be found. The clinical syndrome of post-operative adhesions differs from that of ulcer, the pain being more instant and less acute. The coexistence of jejunal ulcer and adhesions, malignant transformation and contraction of the gastro-enterostomy opening must be considered. The latter often coincides with the development in crater of an ulcer. Literature on the radiographic diagnosis of gastro-jejunal ulcer is meagre. In the majority of instances radiography and particularly serial radiography gives an absolute diagnosis. A crater is seen either on the border of the stomach or the loop of intestine. In some cases this crater is not visible owing to the ulcer not being on the edge; the crater is not seen when the loop is full and becomes visible on the plate taken only when the loop is empty or it may not be visible owing to several other causes. The authors state that they cannot say positively that the absence of a crater definitely eliminates the diagnosis of an ulcer, but they have not seen the combination of a classical ulcer history and a normal skiagram. The paper concludes with a differential diagnosis of the X ray findings.

Post-Operative Eventration.

J. B. LEWIT (*Monatsschrift für Geburtshülfe und Gynäkologie*, March, 1929) discusses the causation of failure of union of the abdominal wall after operation and gives the details of five cases as well as a review of the literature. He considers that the sex of the patient, the age, the position of the incision and the suture material have only a relative significance in the ætiology of this complication. Complete separation of the abdominal incision occurred with silk and catgut alike and he thinks that accurate apposition of the various layers is of more importance. From the experience gained in several instances he is of the opinion that the constitution of the patient plays an important rôle, especially if there be signs of endocrine deficiency. Possibly it may be due to an alteration in the reaction of the tissues which normally are somewhat alkaline. Acidosis is present in many patients and this would cause less rapid healing of the tissues. The pre-operative administration of carbohydrates would prevent such a possibility. On the whole the main cause of complete breaking down of the incision is probably general debility, especially when associated with malignant disease.

Surgical Complications of Dengue Fever.

E. KONDOLEON AND G. JOANNIDES (*Münchener Medizinische Wochenschrift*, February 1, 1929) discuss the surgical complications observed by them in a recent epidemic of dengue fever in Athens. Acute parotitis occurred in ten instances and only two resolved without suppuration. Three of the remaining eight patients died despite incision and drainage. The authors emphasize the grave prognostic significance of this complication. Cultures yielded staphylococci in all but one instance; in this case streptococci were present. Abscesses and carbuncles were common. Their duration was prolonged and healing was slow. Sinus formation was uncommon, although in several patients massive necrosis of soft parts including destruction of bone was noted. In some there were definitely localized abscesses in the peritoneal cavity, although in no instance did a generalized abdominal infection occur. The organisms grown from these foci manifested low vitality.

Transillumination in the Diagnosis of Breast Lesions.

MAX CUTLER (*Surgery, Gynecology and Obstetrics*, June, 1929) states that the use of transillumination as an aid in the diagnosis of breast lesions is of great value. Hitherto, transilluminations has been confined to a very limited field, as, for example, in inflammatory lesions of the sinuses and in the differentiation of solid tumours of the testis and hydrocele. Transillumination is of special value in the localization of the lesion in cases of bleeding nipple. The method suggested by Ewing was first used by Adair who attempted to transilluminate breast tumours, but encountered technical difficulties due to the excessive heat developed by the lamp. The Cameron light was decided upon as the most suitable instrument. The technique is relatively simple. The lamp is placed against the under surface of the breast and gradually moved as different areas in the breast are successively inspected. Acute, subacute and chronic inflammations present a diffuse opacity in the affected area which diminishes or disappears as the inflammation subsides. Solid tumours are opaque, the degree of opacity depending on the size and location of the mass. The character of the opacity, however, does not permit of differentiation between benign and malignant tumours. Cysts filled with clear fluid are translucent, a finding that may be of considerable importance in a differential diagnosis between carcinoma and tense, deep lying cysts which display skin adherence and present the clinical features of a malignant tumour. The intense opacity of blood is one of the most characteristic and important findings in the transillumination of tissues. The opacity in traumatic hæmatoma is intense, uneven, irregular in outline and disappears as the blood is absorbed. Intracystic or duct papillomata associated with a hæmorrhagic discharge from the nipple presents an opacity intense, uniform and sharply circumscribed. Transillumination is of special value in those cases of bleeding from the nipple in which no tumour can be palpated. It enables localization of the lesion. It will differentiate between single and multiple papillomata. The method is simple, safe and a valuable aid in the interpretation of pathological conditions in the breast and is recommended as a routine measure. Coloured plates and diagrams are attached to the article.

Trauma and Bone Sarcoma.

PHILIP STEPHENS (*American Journal of Surgery*, October, 1928) after discussing the literature and quoting two cases of bone sarcoma following trauma concludes that continual irritation or moderate force has a tendency towards the development or at least activation of the growth of bone tumours. There is, however, little or no evidence from which it is justifiable to assume that such tumours are developed through one act of trauma in which the force is moderate or severe.

Cancer of the Face.

H. WILLY MEYER (*American Journal of Surgery*, October, 1928) describing the treatment of cancer of the face states that the most successful methods at present are radiation and surgery. The scalpel used with proper cancer surgery technique in operable tumours is probably the best and safest. Basal cell epitheliomata only are considered. Very small superficial skin epithelioma might be cured by mere curettage or by radium or Röntgen rays or by the various electrical currents. Actual destruction by the galvanocautery, if the lesion is small, is the easiest and quickest method of destruction. In these instances in which the growth overlies or is adherent to cartilage or bone, radium and Röntgen rays frequently fail and the galvanocautery must be used except in the larger lesions which should be treated surgically. In these the cartilage or bone must be removed in many instances. There are two stages in the operation. The first is the total radical excision of the lesion and the second the reconstruction operation for repair. The two stages must be planned before operation by diagrams and geometrical proof of the feasibility of the plan. Colonic anæsthesia is the choice, if local anæsthesia is impossible. Specimens must be marked so that the pathologist may report not only on the pathology of the lesion, but also on the safety of excision. The special cancer technique is outlined and several cases are described in detail.

Medical Societies.

THE QUEANBEYAN-CANBERRA MEDICAL SOCIETY.

THE ANNUAL MEETING OF THE QUEANBEYAN-CANBERRA MEDICAL SOCIETY was held at Canberra, Federal Capital Territory, on July 2, 1929, DR. P. BLACKALL, the President, in the chair.

Jenner's Life and Work.

DR. P. BLACKALL, the retiring President, read a paper entitled: "Jenner's Life and Work" (see page 437).

DR. A. J. CAHILL said he had listened with interest to the paper. He knew something of Jenner's life and character before, but he had not been aware that he was a poet until that night. It was a pleasure to notice how completely the retiring President who was the first President of the Society, had retained his physical and intellectual vigour after his forty years of general practice in the district.

DR. F. W. PONSFORD remarked that Jenner's work was the beginning of a new era in medicine, but he did not believe that Jenner himself could have had any conception of the more recent development of vaccine therapy. He doubted whether they could estimate the influence that Jenner's work had exercised on the development of the practice of modern medicine. With regard to vaccination against small pox it had proved so successful that it had in some measure done away with the need for it. Vaccination had made small pox such a rare disease that most people had never seen a case of it and the people generally had lost the fear of it to such an extent that even in places where vaccination was compulsory, the law was so generally evaded that the community remained unvaccinated.

DR. M. J. HOLMES remarked that although they seldom saw small pox, yet the discovery of vaccination with cow pox as a safeguard against small pox would always be a subject of interest to members of their profession, as it was the commencement of the use of attenuated vaccines for the purposes of conferring immunity. There was always a possible danger of the introduction of small pox because the incubation period of the disease remained the same while the time taken in a journey from the south of Asia to Australia was becoming gradually shorter. Now that travelling by aeroplane was becoming popular, he believed it would become impossible to make sure of keeping out the small pox. He had attended some patients with small pox and he was particularly interested in some hæmorrhagic cases. He mentioned an instance in which a small pox patient had given birth to a healthy baby and he had vaccinated the baby without loss of time. The vaccination had taken and the baby had escaped the small pox and had got on well.

Dr. P. Blackall said he was pleased that the paper had led to such an interesting and instructive discussion. He had himself done a lot of vaccination and he had seen a lot of small pox. In the United Kingdom in his time vaccination had been compulsory and children had had to be vaccinated during the first six months of life. At that time the vaccinations had been practically all arm-to-arm and he believed the practice was safe if carefully done, as the contents of a ripe, uninjured vesicle were sterile. There was, however, a danger of blood or matter getting mixed with the lymph. Arm-to-arm vaccinations were illegal. In Australia he had done a good many vaccinations during periods of scare, but very few at other times. With regard to the most suitable dressing for the arm which was mentioned by some of the members, his experience was that it was better to put no dressing on and cages were more likely to damage the vesicles than to protect them.

Hæmorrhagic forms of small pox were always dangerous and his experience led him to believe that the darker the colour of the staining caused by the hæmorrhage, the worse was the prognosis. However, there was a chance of recovery, particularly where the staining was bright red in colour. It was otherwise in purpuric small pox which was always fatal and always killed the sufferer in a few hours. He had not seen an eruption of vesicles in this variety of the disease, but still it was easy to diagnose if one had seen a case or two of it. The dark spots, like bruises, the blood under the conjunctiva and the blanket fur on the tongue were very characteristic. The most difficult form to diagnose was a very mild infection in which the patient was scarcely ill and had but a very scanty crop of vesicles. His experience was that such cases occurred only in vaccinated persons. He had never seen a very mild case of small pox in an unvaccinated person. He was interested in the case mentioned by Dr. Holmes in which prompt vaccination of the baby of a small pox patient had been successful. It showed that the mother's attack conferred no immunity on the baby. He had seen a baby born with a small pox eruption out on it. Small pox was very fatal to pregnant women. It usually brought on a premature confinement and if the attack was a severe one, mother and infant usually died. He mentioned some instances showing how easily the disease was spread through a community.

He then expressed his gratitude to the members of the Society for having elected him as President when the Society was formed. He felt sure that as the city grew, the Society would grow with it and as he had practised for so long in the district which had now become the seat of government of the Australian Commonwealth, it was a source of great pleasure to him that he had been elected the first President of the Queanbeyan-Canberra Medical Society.

Public Health.

MATERNAL AND INFANT MORTALITY.

THE Director-General of Public Health of New South Wales has taken certain steps aiming at the ultimate reduction of deaths of mothers in child-birth and of infants. In the first place the following document has been issued, notifying the medical profession in the State of New South Wales that puerperal fever has been added to the list of notifiable infective diseases.

Efforts towards the reduction of maternal mortality are being prosecuted by the Public Health Department of New South Wales with the utmost vigour. The latest measure in this direction is a proclamation gazetted today declaring puerperal infection to be a notifiable disease.

Puerperal infection is defined in the proclamation as "any local or general condition which is accompanied by fever and which arises from or is dependent upon any form of infection of puerperal origin occurring in a woman from the end of the first to the end of the tenth day after abortion, miscarriage or child-birth."

The attention of medical men is specially directed to this provision which makes it obligatory on them to notify all cases of such infection. Every case will then be confidentially investigated by a departmental medical officer in an endeavour to control the incidence and to prevent the spread of such infections. A special staff is now available to undertake this work in the strenuous attempt to reduce the number of maternal deaths from preventible causes.

This work includes in addition strict inspection and supervision of private hospitals, midwives and their equipment and the establishment of antenatal clinics, one of which has already been opened under the care of Dr. Elma Sandford-Morgan at the Baby Health Centre, Wilson Street, Newtown. The regular screening of prenatal films and publication in the press of articles on every phase of this important work are other activities directed towards the education of all women.

By these and other means it is confidently hoped that a reduction in the maternal mortality rate will be brought about.

The second measure is an inquiry into the circumstances of the death of mothers and of infants under one month. For this purpose two *questionnaires* have been sent to medical practitioners who have been requested to

supply as many replies as possible whenever a death of a mother or of an infant under one month takes place in their practices. The Council of the New South Wales Branch of the British Medical Association has signified its approval of the inquiry and anticipates that members will assist the department voluntarily without remuneration.

The questions are as follows:

Maternal Mortality.

Name..... Age at death..... Social condition..... Nationality..... Address (present, past or of next of kin)..... Occupation..... Cause and date of death ..... Certified by Dr.....present (not present) at confinement. Husband's occupation..... Economic status..... Home conditions..... Date of confinement..... Where confined..... Date and time when fatal illness commenced..... If removed from home to hospital, name of hospital..... Previous general and obstetric history (including number and condition of any existing children)..... Name and address of midwife..... Resident nurse or visiting..... If visiting nurse, frequency of visits to patient during puerperium..... Name and address of person (if any) who attended patient between midwife's visits.....

Pregnancy.

Health during pregnancy..... Abnormal conditions (if any)..... Full-time/not full-time..... If not full-time, at which month terminated by induction (natural process)..... Any ante-natal treatment..... At which month first consulted doctor..... How frequently was urine examined?..... How long before labour was last examination of urine made?..... Any other ante-natal examination or treatment..... Results of ante-natal treatment.....

Labour.

Preparation for labour (bath, enema, shaving *et cetera*) .. Vaginal examinations and by whom..... Gloves?..... Gown?..... Indications of eclamptic intoxication (if any)..... Presentation..... Duration of labour..... Complications of labour..... Facilities for sterilization (including bed-pans)..... Operative or other manipulations and at which stage..... Perineum (torn, intact); Cervix (torn, intact); Anæsthetic?..... Administered by..... Drugs administered and by whom..... Placenta: normal, abnormal, complete, retained; evidence of.....

Lying-in.

Any abnormality..... Times at which temperature taken..... Material used for diapers..... How sterilized..... Douche given..... Catheterization.....

The Child.

Sex..... Condition at birth..... Present condition..... If since dead, date and cause of death..... Injury (if any) received during birth..... Malformation..... Inflammation or discharge from eyes..... Any other abnormality.....

Infantile Mortality Under One Month.

Name..... Sex..... Age at death.....(Legitimate, Illegitimate). Cause and date of death..... Parents' address..... Certified by Dr..... present (not present) at confinement. Parents' occupation and economic status..... Home conditions..... Date of birth..... Where born..... How long ill..... Breast or artificially fed..... Number of previous children: Living..... Dead..... Name and address of doctor present at confinement..... Name and address of midwife present at confinement..... Weight at birth..... Condition at birth..... Injury (if any) received during birth..... Malformation or other abnormality..... Visited by Baby Health Centre Nurse.....(State which Health Centre).

Particulars Concerning the Mother During Pregnancy.

Health before pregnancy..... Health during pregnancy..... Abnormal conditions (if any)..... Full time/not full time. If not, at which month terminated (artificially, naturally)..... Any ante-natal treatment..... At which month first consulted doctor..... How frequently was urine examined?..... How long before labour was last examination of urine made?..... Any other ante-natal examination or treatment..... Results of ante-natal treatment.....

Labour.

Indications of eclamptic intoxication (if any)..... Presentation..... Duration of labour..... Complication of labour..... Operative or other manipulation and at which stage..... Placenta: normal, abnormal, complete, retained; evidence of.....

Obituary.

EDWARD CHAMPION.

DR. EDWARD CHAMPION, whose death was recorded in a recent issue of this journal, was the son of Benjamin Champion, of Swanston Street, Melbourne. He was born in 1867 and in 1883 he went to the Church of England Grammar School, Melbourne. He was successful in his school work and became prominent in sport. He was a member of the cricket eleven, captain of the football team, captain of the boats and stroke of the school crew for two years. He was captain of the school in 1885. After matriculation he entered Trinity College in the University of Melbourne as an undergraduate. His interest in sport was maintained. He was the first student at the University to gain the triple blue; this he did in cricket, football and rowing. That he did not neglect his studies is shown by the fact that he graduated with second class honours in medicine and surgery. He became senior student in his college. In 1891 he graduated as Bachelor of Medicine and in the following year he obtained the degree of Bachelor of Surgery. After graduation he was a resident medical officer at the Melbourne Hospital for twelve months. He then went to Ballarat where he became attached to the Ballarat Hospital. He was attached to this hospital as Honorary Surgeon for seventeen years and at the time of his death was Honorary Consulting Surgeon. In 1928 he became a Fellow of the College of Surgeons of Australasia.

Edward Champion was one of those who answered the call during the Great War. He joined the Australian Army Medical Corps in 1917. In August of that year he was attached to the First Australian Casualty Clearing Station. In this unit he became one of the operating surgeons and in July, 1918, he was promoted to the rank of major. While he was attached to his Australian unit, he served temporarily at many British casualty clearing stations. In March, 1919, he was returned to England and until his departure for Australia in the following September he acted as health inspector of troopships at Plymouth.

In his life at Ballarat he took his full share and more than his share in the life of the community. Naturally he took a leading place in the sporting societies of the city and in its philanthropic institutions. He had an extensive practice and was beloved of his patients. He spared himself in no way and left behind him an example which may well be followed by others who were his juniors. The people of Ballarat are the poorer by the loss of a medical practitioner who worked for them with a sense of duty and with sincerity; his friends and acquaintances will miss a delightful companion and a staunch comrade; the medical profession in Victoria has been deprived of one of its best country practitioners. Heartfelt sympathy is felt for his widow, two sons and a daughter.

REGINALD FRESHNEY.

WE regret to announce the death of Dr. Reginald Freshney which occurred at Toowoomba, Queensland, on September 17, 1929.

DONALD BENNETT.

WE regret to announce the death of Dr. Donald Bennett which occurred at Queenstown, Tasmania, on September 17, 1929.

Correspondence.

ANTARCTIC RESEARCH EXPEDITION.

SIR: On the eve of my departure to join the *Discovery* at Cape Town as medical officer to the Antarctic Research Expedition, I wish to acknowledge my indebtedness to those who have helped in supplying apparatus and equipment. All the dressings required have been supplied by Messrs. Johnson and Johnson, of Slough, England. This firm approached Sir Douglas Mawson in London and offered to give anything mentioned in their catalogue; to Allen and Hanburys, Limited, we are indebted for the surgical instruments. The medical supplies have been given by Burroughs, Wellcome and Company, of Sydney, who have donated sledging outfits and base pannier to the value of twenty-five pounds. The rest of the medical supplies has been donated by Elliott Brothers, Limited, of Sydney, and F. H. Faulding and Company, Limited, of Adelaide. Dr. H. R. and Dr. G. S. Greenwell, dental surgeons, of Macquarie Street, Sydney, donated a case of instruments for stopping teeth along with material for stopping and they spent much time in showing me how to use the equipment. Sir William Vicars has donated a Philips portable X ray apparatus and Philips and Company have donated the films to use with this apparatus. Mr. Alexander Moir, of Sydney, has donated a Zeiss Icon cinema camera especially adapted for microscopical work. Mr. E. K. White gave a cheque for sixty pounds for special apparatus. Dymock's Book Arcade, Limited, placed the whole of its polar library at my disposal and offered anything we required from its shelves. I am especially indebted to the Royal North Shore Hospital of Sydney for supplying and packing in special cases the majority of the reagents required for both bacteriological and biochemical researches. To Professor D. A. Welsh and Professor H. Priestley and Dr. A. H. Tebbutt, of Sydney, I am indebted for both material and advice with regard to my proposed researches. I am also indebted to the following for advice and help in technical matters: Dr. C. Bickerton Blackburn, Dr. F. S. Hansman, Dr. E. Morris Humphery and Dr. Eric Blashki, Dr. E. C. Temple Smith, Dr. T. M. Furber and Miss Joyce Cocks. Many others have been associated with those already mentioned and to them I offer my thanks.

Yours, etc.,

W. W. INGRAM.

Sydney, September 10, 1929.

THE LIBRARY PROBLEM.

SIR: While regretting the necessity for it, one is glad to see that you are again urging the need for better medical libraries in the Commonwealth. The importance of the subject would have justified a discussion at the late Congress. The suggestion of your correspondent that "a list of medical journals arranged according to the special branches of study that can be obtained in various centres" has been rendered possible as far as Victoria is concerned by the work of Mr. Pitt, of the Public Library, who continued that begun by the late T. S. Hall in making a compilation of the scientific journals in the libraries of the societies in Melbourne. Though your idea, Sir, of a complete library on the methods you mention would greatly improve present conditions, it would not provide a ready reference library for each of the Australian capitals. It is, however, an object towards which we should strive. Meanwhile, cannot something be done by calling early in each year a meeting of representatives of the University, Public Library, Royal Society, chemical, microscopic and other scientific societies and ascertaining from each the amount they are willing to spend during the year on books during the year? If this is done, it ought to be possible for each representative to supply a list of proposed purchases and to agree not to buy duplicates except in certain special cases and also to allow for books appearing during the year. I may say that in this State one such conference was proposed, but our representatives became disheartened over the matter, because the Public Library authorities would not agree. This may happen again, but even so, it is surely no reason for not making another effort. Here in Victoria we have an excellent library as far as room space and appurtenances are concerned, but when that is said nothing further of any good can be mentioned for about the only money spent on it is that expended on binding journals and if it were not that we receive a certain number of the books which are sent to you for review we would scarcely have five additional new volumes a year. Visitors have frequently commented on its starved condition. For years past it has been miserably treated and is a reproach to us. I agree with you when you say the head of each department in the medical schools gathers a small but highly useful special library, but many of these books are obtained from the medical library and some of the professors must all retain them for an unreasonable time and thus show little consideration for others. This was further instanced by my own experience on one occasion during a Christmas vacation when I went to the library to look up some references and found it locked. On inquiring the reason I was told that one of the professors had gone off for his holidays and taken the keys with him.

Joining you in the hope that something definite will soon be done,

Yours, etc.,

JAS. BOOTH.

North Melbourne,
September 7, 1929.

THE GONOCOCCI.

SIR: In the issue of the journal dated September 7, 1929, Dr. J. M. O'Donnell states that the gonococcus can survive a temperature of "115° F. and more for lengthy periods of time."

I think that it should be pointed out that opinions differ very greatly as to the temperature that the gonococcus can survive.

Grover ("High Frequency Practice," 1929, page 428) states that: "The activity of gonococci is inhibited by a temperature of 104° F. and is destroyed almost momentarily by a temperature of 113° F.."

Corbus and O'Conner ("Diathermy in the Treatment of Genito-Urinary Diseases with Special Reference to Cancer," 1925, page 29) noted that cultures of gonococci left in the incubator overnight at a temperature of about 102° F. were dead in the morning. On page 30 they state: "Where the gonococci can be localised in the tissues an exposure of 108° F. will destroy them in 30 or 40 minutes."

Cumberbatch and Robinson ("Treatment of Gonococcal Infection by Diathermy," 1925, pages 8 and 9) quote a number of observers, among them Jordan: "According to most experimenters cultures are injuriously affected by a temperature of 104° to 105° F.." MacFarlane's "Pathology" is quoted to the effect that the gonococcus is injured or destroyed between 102·2° F. and 104° F..

Obviously some very competent observers have found that gonococci are destroyed or injured by quite low temperatures.

Further on, Dr. O'Donnell states that "No urethra or cervix could withstand such temperatures" (presumably 115° F.) "without suffering trauma."

Now Cumberbatch and Robinson in the book already quoted, on page 13, state that they have heated the cervix

up to 120° F., and the urethra to 115° F., without damage; and again, on page 30, state that the normal epithelial cell can survive a temperature of 118° to 120° F. for an hour, and connective tissue cells can endure 122° F. for longer.

Probably the action of diathermy in gonococcal infections is a double one, killing outright those organisms that are in the zone of greatest heat and by the active hyperæmia it produces, stimulating the tissues to put up a more vigorous fight against the remainder which have had their vitality lowered.

Yours, etc.,

E. P. DARK.

Soper Chambers,
Katoomba.
September 9, 1929.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

The Harry J. Clayton Memorial Prize.

IN December last a number of Sydney practitioners determined to raise a fund for the purpose of perpetuating the memory of the late Harry John Clayton. A notice appeared in our issue of December 15, 1928. Dr. A. L. Dawson and Dr. Eric M. Fisher were the originators of the fund. The response to the invitation to subscribe was a generous one. The fund has now been closed and a memorial tablet has been erected at the Royal Prince Alfred Hospital, where the late Harry John Clayton held the position of medical superintendent for several years. The balance of the fund amounts to £1,044. This sum has been handed to the University of Sydney. It will be invested and the interest will be used for an annual prize to be awarded to a final year medical student for proficiency in medicine. The prize will be known as the Harry J. Clayton Memorial Prize.

A MEETING of the Senate of the University of Sydney was held on September 2, 1929.

Mrs. G. A. Wood informed the Senate that the sum of £100 would be paid to the University this year by the family of the late Professor G. A. Wood for the purpose of perpetuating the prizes in history donated by the late Professor during his lifetime. The gift was accepted with grateful thanks.

Dr. A. J. Nicholson, McCaughey Lecturer in Entomology, tendered his resignation of the Lectureship on account of his appointment as Deputy Chief of the Entomological Section of the Council for Scientific and Industrial Research. The resignation was accepted with regret.

The following appointments were approved:

Dr. E. W. Haggett as Lecturer in Dental Histology in the Department of Anatomy.

Dr. P. N. Walker-Taylor as Craig Fellow in Urology for a period of twelve months.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered under the provisions of *The Medical Act*, 1912 *and* 1915, of New South Wales as duly qualified medical practitioners:

Conlon, Victor Alexander, M.B., B.S., 1925 (Univ. Melbourne), Lockhart.

Drummond, Robert, M.B., Ch.B., 1924 (Univ. Glasgow), Maroubra.

Dyring, Valdemar Carl, M.B., B.S., 1926 (Univ. Melbourne), Tweed Heads.

Griffiths, Ernest William, M.B., B.S., 1906 (Univ. Adelaide), Parramatta Road, Ryde.

Salisbury, Charles Victor, L.R.C.P. (Edinburgh), 1928; L.R.C.S. (Edinburgh), 1928; L.R.F.P.S. (Glasgow), 1928; University Club, Sydney.

Tolputt, Percy Thomas, L.R.C.P. (Edinburgh), 1892; L.R.C.S. (Edinburgh), 1892; L.R.F.P.S. (Glasgow), 1892; Hotel Grand Central, Sydney.

For additional registration:

Fisher, Walter Edward, M.R.C.P. (London), 1929.

VICTORIA.

THE undermentioned has been registered under the provisions of Part I of the *Medical Act*, 1915, of Victoria, as a duly qualified medical practitioner:

Steele, David McGowan, M.B., B.S., 1927 (Univ. Melbourne), Coleraine.

QUEENSLAND.

THE undermentioned have been registered under the provisions of *The Medical Act* of 1925, of Queensland, as duly qualified medical practitioners:

Maling, Henry Coverley, M.B., B.S., 1925 (Univ. Melbourne), Mitchell.

Eizenberg, Horace Joseph, M.B., B.S., 1929 (Univ. Sydney), Toowoomba.

Thomson, Alastair Crawford, M.B., Ch.B., 1927 (Univ. Glasgow), Townsville.

Restoration to Register:

Wilbe, Ernest Edward, L.S.A. (London), 1907, D.T.M. (Univ. Liverpool), 1913; Wowan.

A TESTIMONIAL.

A SMALL committee of honorary medical officers of the Royal Prince Alfred Hospital has been formed for the purpose of establishing a fund to provide a testimonial to Mr. Alexander Wilson, the chief assistant at operations. Mr. Wilson has given forty-eight and a half years' service to the hospital and has been associated with thousands of medical students, resident medical officers and honorary medical officers at the hospital. Mr. Wilson will retire at the end of September, 1929. Professor A. E. Mills, Dr. F. P. Sandes, Dr. St. John W. Dansey, Dr. H. H. Schlink, Dr. H. R. G. Poate, Dr. J. C. Halliday, Dr. R. S. Godsall, Dr. A. L. Dawson and Dr. E. M. Fisher invite contributions from past students and others who have known Mr. Wilson and have had an opportunity of appreciating the value of his long and honourable service at the Royal Prince Alfred Hospital. Cheques should be addressed to Dr. R. Angel Money, 143, Macquarie Street, Sydney, and should be endorsed, "The Treasurer of the Wilson Fund."

Books Received.

WHO'S WHO AMONG THE MICROBES, by William H. Park, M.D., and Anna W. Williams, M.D.; 1929. New York: The Century Company; Sydney: Angus and Robertson, Limited. Post 8vo., pp. 315, with illustrations. Price: 12s. 6d. net.

PHYSICAL THERAPEUTIC TECHNIC, by Frank Butler Granger, A.B., M.D., with a foreword by William D. McFee, M.D.; 1929. Philadelphia: W. B. Sanders Company; Melbourne: James Little. Royal 8vo., pp. 417, with illustrations. Price: 32s. 6d. net.

ARMY HEALTH IN INDIA: HYGIENE AND PATHOLOGY, by Lieutenant-Colonel John Mackenzie, M.A., M.B., Ch.B., D.P.H.; with a Foreword by Lieutenant-General Sir Matthew Fell, K.C.B., C.M.G., F.R.C.S., K.H.P.; 1929. London: John Bale, Sons and Danielsson, Limited. Demy 8vo., pp. 165, with illustrations. Price: 10s. 6d. net.

AN INTRODUCTION TO THE STUDY OF THE NERVOUS SYSTEM, by E. E. Hewer, D.Sc. (London), and G. M. Sandes, M.B., B.S. (London), M.R.C.S., L.R.C.P.; 1929. London: William Heinemann (Medical Books) Limited. Crown 4to., pp. 116, with illustrations. Price: 21s. net.

THE MECHANISM OF THE LARYNX, by V. E. Negus, M.S. (London), F.R.C.S. (England); with an Introduction by Sir Arthur Keith, F.R.S.; 1929. London: William Heinemann (Medical Books) Limited. Crown 4to., pp. 560, with illustrations. Price: 45s. net.

THE PRINCIPLES OF PHYSICS: A TEXTBOOK FOR STUDENTS OF PHARMACY, by C. J. Smith, Ph.D., M.Sc., A.R.C.S., D.I.C.; 1929. London: Edward Arnold and Company. Crown 8vo., pp. 295, with illustrations. Price: 9s. net.

KATOLOG FÜR ÄRZTE UND KRANKENHAUS-MÖBEL (Catalogue of Hospital and other Medical Furnishings); 1929. Berlin: Medicinisches Waarenhaus. Royal 4to., profusely illustrated.

RECENT ADVANCES IN CARDIOLOGY, by C. F. Terence East, M.A., M.D. (Oxon.), F.R.C.P. (London), and C. W. Curtis Bain, M.C., M.B. (Oxon.), M.R.C.P. (London); 1929. London: J. and A. Churchill. Post 8vo., pp. 350, with illustrations. Price: 12s. 6d. net.

STONE IN THE URINARY TRACT, by H. P. Winsbury White, M.B., Ch.B. (Edin.), F.R.C.S. (Edin.), F.R.C.S. (Eng.); 1929. London: J. and A. Churchill. Royal 8vo., pp. 350, with illustrations. Price: 25s. net.

Diary for the Month.

OCT. 1.—New South Wales Branch, B.M.A.: Council.
OCT. 1.—Tasmanian Branch, B.M.A.: Council.
OCT. 1.—Eye, Ear, Nose and Throat Section, South Australian Branch, B.M.A.
OCT. 2.—Victorian Branch, B.M.A.: Branch.
OCT. 2.—Western Australian Branch, B.M.A.: Council.
OCT. 3.—South Australian Branch, B.M.A.: Council.
OCT. 4.—Queensland Branch, B.M.A.: Branch.
OCT. 8.—Tasmanian Branch, B.M.A.: Branch.
OCT. 8.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 9.—Central Northern Medical Association, New South Wales.
OCT. 10.—Victorian Branch, B.M.A.: Council.
OCT. 10.—New South Wales Branch, B.M.A.: Clinical Meeting.
OCT. 11.—Queensland Branch, B.M.A.: Council.
OCT. 15.—Tasmanian Branch, B.M.A.: Council.
OCT. 15.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
OCT. 15.—New South Wales Branch, B.M.A.: Organization and Science Committee.
OCT. 16.—Western Australian Branch, B.M.A.: Branch.
OCT. 22.—New South Wales Branch, B.M.A.: Medical Politics Committee.
OCT. 23.—Victorian Branch, B.M.A.: Council.
OCT. 24.—Section of Medical Literature and History, New South Wales Branch, B.M.A.
OCT. 25.—Queensland Branch, B.M.A.: Council.
OCT. 31.—New South Wales Branch, B.M.A.: Branch.
OCT. 31.—South Australian Branch, B.M.A.: Branch.

Medical Appointments.

Dr. Albert John William Philpott (B.M.A.) has been appointed Deputy Inspector-General of the Insane, Victoria.

* * *

Dr. Alan Turner Paul Pitt (B.M.A.) has been appointed Government Medical Officer at Cunnamulla, Queensland.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

CHILDREN'S HOSPITAL, CARLTON, VICTORIA: Honorary Psychiatrist.

MELBOURNE HOSPITAL, VICTORIA: *Locum Tenens.*

VICTORIAN EYE AND EAR HOSPITAL: Medical Superintendent, Resident Surgeons (three).

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 21, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital. Toowoomba Friendly Societies Medical Institute.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

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